

**ENGINEERING STANDARDS FOR PUBLIC WORKS
CONSTRUCTION**



VOLUME 1

DESIGN AND PLANNING

***Approved by Ridgefield City Council, Resolution 655
October 10, 2024***

***Technical Changes Approved by Public Works Director/City
Engineer***

February 6, 2025 and June 26, 2025

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CHAPTER 1

GENERAL PLANNING, DESIGN, AND APPROVAL REQUIREMENTS

CHAPTER 1 - GENERAL PLANNING, DESIGN, AND APPROVAL REQUIREMENTS

1.00 Requirements for Public and Private Improvements

A. General

The purpose of these standards is to define requirements for the design and construction of public and private improvements to serve new and future developments. These include street, bikeway, drainage, and water improvements as required by the development review process, City Ordinance, and other City policies adopted by the City Council or the Mayor. ~~Requirements for neighborhood parks, including furnishings, play structures, bicycle racks and other park infrastructure shall be in accordance with the most recent edition of the City's Parks and Recreations Comprehensive Plan.~~ Requirements for parks, trails, and recreation infrastructure shall be in accordance with Volume 3 of these standards which was approved by Council on May 22, 2025. Where not governed by building or other codes, standards for site grading, erosion control, parking lot and driveway construction, and other infrastructure on private property shall be governed by these standards for the purposes of design and inspection. No such work shall commence prior to City approval of the construction plans. Designs submitted shall be stamped by a registered Professional Engineer licensed to practice in the State of Washington.

All public improvements and private streets, parking lots, sidewalks, and driveways shall be designed and constructed according to the most recent edition of the *ADA Standards for Accessible Design* and the *Public Right of Way Accessibility Guidelines* in such a manner as to be readily accessible to and usable by individuals with disabilities as per the requirements of the Americans with Disabilities Act of 1990. This includes providing curb ramps at intersections with pedestrian crosswalks to allow a smooth transition between street and sidewalk elevations.

The Washington State Department of Transportation Standard Specifications including their most recent revisions are hereby adopted and incorporated as part of this document by reference except as modified herein.

B. Organization of Standards

These Standards are separated into three volumes: 1) Volume 1 - Design and Planning, 2) Volume 2 - Construction Specifications and Details, and 3) Volume 3 - Parks, Trails and Recreation Design and Construction Requirements.

C. Shortened Designation

These City of Ridgefield Engineering Standards for Public Works shall be cited routinely in the text as the "Standards".

D. Applicability

These Standards shall govern all new construction and upgrading of facilities both in the right-of-way and on private property for: transportation related facilities; storm drainage facilities and stream channel improvements; water improvements; and park, recreation, and open space facilities used by the public.

E. Requirements for Public Welfare

It is the purpose of these standards to provide for and promote the health, safety, and welfare of the general public, and not create or otherwise establish or designate any particular class

or group of persons who will or should be especially protected or benefited by the terms of these standards.

The Standards established by this Chapter are intended to represent the minimum design standards. Compliance with these Standards does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the general public. Additionally, since these are minimum standards, special site conditions and environmental constraints may require a greater level of protection than would normally be required under these Standards. The designer must apply these Standards bearing in mind these constraints.

F. Two-year Maintenance Surety Bond Requirement

The developer is required to provide a maintenance bond for a minimum of 20% of the full cost of construction for all public improvements and any private improvements that directly connect to or otherwise effect City utilities for a period of two (2) years after acceptance of the project, which will not be released without written approval by the City. The developer is to provide from their Contractor an itemized contractor's cost worksheet on the City's cost estimating template. Contractor shall use State Prevailing Wage costs to develop estimate. Coordinate with City for latest template. ~~The 2-year maintenance agreement includes public and private construction work.~~ The Contractor shall place the following note on the worksheet; "To the best of my knowledge the itemized quantities and cost included herein are an accurate account of the full cost of construction to be provided as required to meet the City's Maintenance Bond requirement".

For multi-phased developments where public access road(s) was (were) built and accepted for an earlier phase, and where the access road(s) will serve as construction access for future phase(s), the City will request the developer and their contractor to extend the surety bond for such access road(s) until such time a second access road is built for the development, or until all phases are completed. The surety bond period will then be extended for two years after completion and construction acceptance of the public and private improvements of that final phase. Its release is subject to final inspection and acceptance by the City, or acceptance of repairs requested by the City as part of the maintenance bond inspection prior to the expiration of the bond.

G. Requirement for Street Utility Extension to Limits of Property

Public streets, bikeways/multi-purpose trails, water mains, and storm sewer mains shall be extended through and to the extremes of the property being developed for extension to future development as determined by the City. The developer shall not be reimbursed for utility extensions to the limits of the property being served. If a utility line must be oversized to serve the ultimate tributary area beyond the proposed development, the developer may request compensation for over sizing as authorized by Ridgefield Municipal Code. Such requests shall be in writing and shall be made to the City Engineer.

H. City Acceptance Process- Planned Unit Developments (PUD) and Subdivisions

Various permits required for completion and occupancy of any home within a PUD or subdivision must meet the requirements listed herein. These requirements are in addition to any requirements of the City Building or Community Development departments.

1.) Model Home Permits

The following requirements shall be met before the issuance of any building permit.

- a. The lot on which the home is to be constructed shall have either property corner pins or a building pad survey.
- b. At a minimum, 20-foot gravel roads shall be installed from a paved public street to the lot on which the home is to be constructed.
- c. Street signage must be installed from an existing public street to the lot on which the home is to be constructed.
- d. If the final plat for the subdivision has not been recorded, the subdivision shall display temporary signage that clearly indicates the original property address prior to subdivision. If the property had no situs address, prominent signage with the subdivision name shall be installed to assist emergency services in locating the property in the event of an emergency.
- e. An active fire hydrant must be located within 500 feet of any combustible construction.
- ~~f. A bond shall be provided for 150% of the cost of all landscape required by the subdivisions Notice of Decision (NOD) or Final Order. This landscaping shall include all required street trees.~~
- ~~g. A bond shall be provided for 100% of the cost of three years landscape maintenance for all landscape required by the subdivisions NOD or Final Order. This requirement may be waived by the City Engineer if an acceptable maintenance agreement is provided.~~

2.) Building Permits

The following requirements shall be met before the issuance of any building permit other than a model home permit.

- a. All requirements listed in Section H.1 above.
- b. The subdivision Final Plat must be recorded.

If a performance bond is used to defer public improvements for the Final Plat process, all public improvements must be in place and accepted by the City prior to issuance of any Certificates of Occupancy, including temporary.

3.) Water Meter issuance

The following requirements shall be met prior to issuance of a water meter for a single-family residence the following requirements shall be met.

- a. Inspection approval of all water lines, including pressure testing and bacterial tests in accordance with Volume II of these Standards.
- b. Inspection approval of all meter boxes and meter setters.
- c. Accepted water meter setters include: The Ford 70 series coppersetter Part number VH74-15W-41-44-Q-NL or Approved Equal.
- d. Accepted water meter boxes include: Concrete Meter Box w/ drop in CI Reader Lid 8" top section, 10" bottom section Brooks 65, Raven Meter box, or approved equal.

4.) Acceptance and Final Occupancy

The following requirements shall be met prior to final occupancy of any building within a PUD, or phase thereof.

- a. All requirements listed in Sections H.1 through H.3 above.
- b. All required inspections are completed through the inspection checklist as maintained in the development portal (currently Smartgov).
- c. A maintenance bond for 20% of the cost of all public and private improvements.
- d. Approved as-built drawings and files shall be submitted in PDF and AutoCAD formats.
 - i. AutoCAD files shall consist of design linework, lot lines, right-of-way lines, and utilities (public and private) at a minimum. The City may request additional files for records.
- e. Copies of recorded deeds for all dedicated public assets.

1.01 Precedence of Documents

If there is a conflict between approval documents, the document highest in precedence shall control. The precedence shall be:

- First:** Permits from other agencies or jurisdictions, as may be required by law.
Second: Notice of Decision and Final Order Conditions of Approval, and project specific Development Agreements.
Third: City of Ridgefield Engineering Standards for Public Works Construction.
Fourth: City of Ridgefield Ordinances (Ridgefield Municipal Code).
Fifth: Plans and details prepared by the design engineer and approved by the City.
Sixth: American Public Works Association / Washington State Department of Transportation Standard Specifications, latest edition.
Seventh: Reference specifications.

Supplemental written agreements and approved revisions to plans and specifications by the appropriate jurisdictions will take precedence over documents listed above. Detailed plans shall have precedence over general plans. In any event, the determination of the City Engineer shall be final.

1.02 Abbreviations and Definitions

AASHTO	American Association of State Highway and Transportation Officials
AC	Asphaltic Concrete
ACI	American Concrete Institute
ADA	Americans with Disabilities Act of 1990
ADT	Average Daily Traffic
ANSI	American National Standards Institute
APWA	American Public Works Association
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association

Bicycle Facilities	A general term denoting improvements and provisions which accommodate or encourage bicycling, including parking facilities, maps, signs, pathways, bike lanes, widened sidewalks, bikeways and shared roadways designated for bicycle use.
Bicycle Lane (Bike Lane)	A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists
Bicycle Path (Off-Street Pathway)	A paved pathway physically separated from motorized vehicular traffic by an open space or barrier within an independent right-of-way
Bicycle Route (Bike Route)	A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number or as designated on a bicycle map, brochure or guidebook
Bikeway	Any road, path or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes
CBE	Crushed base equivalent (CBE) is the number that directly relates the traffic coefficient to the required number of inches of rock for street structural sections
CBR	California Bearing Ratio
City	City of Ridgefield with the Public Works Director <u>City Engineer or designee</u> as the lead contact person
City Engineer	City of Ridgefield's consulting or staff city engineer having authority specified in State law or City ordinances, or their designated representative
Contractor	The agent of the developer completing the construction activities associated with a given project
Contractor's Equipment	The phrase "Contractor's Equipment" shall include all items of materials or equipment remaining in the contractor's ownership and removed from the site upon completion of the project
Developer	The owner and/or their agent responsible for a given project
DAHP	The Department of Archaeology and Historic Preservation
Engineer	The City Engineer
Engineering Acceptance	Acceptance of ownership of donated assets by the City. Initiates the two-year maintenance period for the developer.
Engineering Standards	The latest edition of the "City of Ridgefield Engineering Standards for Public Works Construction".
EPA	U.S. Environmental Protection Agency
Equipment	The machinery, accessories, appurtenances and manufactured articles to be furnished and/or installed under the Project

FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
IE	Invert Elevation
Intersection	Refers to the area jointed by two (2) or more roads intersecting. For approaches of a continuous street at an acute curve or some other angle point with different street names
Item	A convenient subdivision of work under these specifications, as herein separately described
Material(s)	These words shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise) and any other classes of material to be furnished in connection with the project
MUTCD	Manual on Uniform Traffic Control Devices
Or Equal	Any manufactured article, material, method, or work which, in the opinion of the Engineer, is equally desirable or suitable for the purposes intended in these specifications and contract, as compared with similar articles specifically mentioned herein
OSHA	Occupational Safety and Health Administration
Parking Lot	Paved surfaces on private property intended for the movement and storage of vehicles
Plans	The plans shall mean all official drawings or reproductions of drawings made or to be made pertaining to the work provided for in the contract, or to any structure connected therewith
Private Improvements	Any improvements that will be owned and/or maintained in common by a future Homeowner's Association, Business Association, lot owners, or tenants (i.e. are not publicly owned)
Project	The structure or improvement to be constructed in whole or in part through the performance of the contract
PRV	Pressure Reducing Valve
Sidewalk	The portion of a street designed for preferential or exclusive use by pedestrians
Specifications	The specifications shall mean the prescribed directions, requirements, explanations, terms and provisions pertaining to the various features of the work to be done, or manner and method of performance, and the manner and method of measurements and payments. They also include directions, requirements, and explanations as set forth on the plans
Standards	City of Ridgefield Engineering Standards for Public Works Construction, Volume 1, 2, and 3 latest edition
Standard Details	The latest edition of the City of Ridgefield's standard details for public works construction. Reduced copies are included in Appendix A of Volume 2 of these standards

Standard Specifications	The latest edition of the "Standard Specifications for Road, Bridge, and Municipal Construction" as published by the Washington State Department of Transportation and the American Public Works Association
Street	A public way which affords the principal means of access to abutting property
Traffic Coefficient	A number used in determining the structural section of a street
Trail	In the context of the Standards - "Trail" is synonymous with Multi-use Path (off-street pathway)
UL	Underwriter's Laboratory
WSDOT	The Washington State Department of Transportation
Wetlands	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Identification and delineation of jurisdictional wetlands and wetland boundaries shall be done by a qualified biologist using applicable State and Federal guidelines.
Words and Phrases	Whenever the words, "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that the direction, requirement or permission of the Owner and Engineer is intended. The words, "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary or proper in the judgment of the Owner and Engineer. The words, "approved", "acceptable", "satisfactory", or words of like import shall mean approved by or acceptable to the Owner and Engineer
Work	The work necessary to manufacture and deliver machinery, equipment and material and/or the furnishings of all labor, tools, material, equipment, construction equipment, working drawings, where required, and other, necessities for the construction or erection of the structures shown and called for in the plans, specifications and contract, and the act of constructing or erecting said structures complete.

1.03 Permits

Permits, approvals, or agreements are required by the City, and sometimes other jurisdictions, prior to initiating any construction or demolition work elements described within these Standards.

Construction of improvements without the required permits may, at the discretion of the City Engineer or ~~Public Works Director~~ designee, result in the following penalties:

- Immediate stop work order in force until all applicable permits are received
- Removal and reconstruction of improvements in accordance with approved plans
- Increased maintenance bond amounts

- Increased warranty periods
- Refusal of City to accept improvements with applicable permits

The majority of work covered under these Standards will require multiple permit authority reviews and approvals. Several types of permits and approvals require prior approval from the authority before a building or other substantial permit can be issued. Any questions regarding information about permits, approvals, and agreements should be directed to the City Engineer.

The following general categories describe the major permits, approvals, and agreements, along with issuing permit/code authority if other than the City of Ridgefield:

A. Environmental Review

For most projects, including clearing and grading activity, an Environmental Checklist must be completed by the applicant and submitted along with plans, specifications, and other information when approval or permits are being requested for a project. The Community Development Director conducts the Environmental Review and makes a SEPA Threshold Determination for the City.

Projects larger than one acre require coverage under the State of Washington Department of Ecology's Construction Stormwater General Permit. No grading permit shall be issued until proof of coverage has been provided.

B. Building Permits

A Building Permit is required for all construction work for structures including alteration, repairs and demolition. This includes retaining walls over 4 feet in height or with a surcharge loading, and fences over six (6) feet tall. Box and arch culverts are also included.

C. Approvals and Other Permits

There are several other permits or approvals which may be required and referred to in these Standards: Developer Extension Agreements; plat and short plat approvals; and Certificate of Occupancy.

In addition, there are several other City approvals (land use) which may have been obtained prior to the above listed permits and which may affect the Standards as contained in this document.

1.04 General Requirements for Utility Extensions (Storm Sewer, Water)

- When extension of the existing utility system for service is required, the developer shall submit site and improvement plans, utility design plans and design review and administration fees. The utility design plans shall be prepared and submitted as described in these Standards.
- Easements for the utility system shall be prepared by a surveyor or engineer licensed to practice in the State of Washington. The easement shall be reviewed and approved by the City prior to acceptance. All public utility easements shall be a minimum of 15 feet wide unless otherwise noted in these standards or required by the City Engineer. Width and location of private utility easements shall be determined by the City Engineer or the Building Official as appropriate.
- Upon final completion and final inspection approval, Public Works will issue a letter of "Engineering Acceptance" to the developer indicating acceptance by the City of the developer extension. The two-year maintenance period for all developer constructed improvements begins on the date of Engineering Acceptance.

- D. The developer shall have a surveyor licensed in the State of Washington provide final as-built elevations of manhole inverts and tops, gravity pipe grades, and utility locations. All elevations shall be from Clark County Datum NGVD 1929(47).

1.05 Submittal Requirements

A. General

- 1.) The following documents shall be submitted for engineering review:
 - Design Plans for all streets, stormwater facilities, and water utilities
 - Sanitary sewer utilities to be included for City reference. Plans will be reviewed by the approving agency
 - Grading Plans
 - Erosion Control Plans
 - Lighting Plans [to include details sheet and a photometric analysis](#)
 - [Transportation Plans that include road classifications \(such as Local A access streets into and through subdivisions\), and pedestrian and vehicular circulation paths](#)
 - Landscape Plans
 - Traffic Control Plans
 - [A tabulation sheet that includes all quantities of public improvements, open space and critical areas](#)
 - [Any “condition\(s\) of approval” items required prior to engineering approval, in the Land Use Notice of Decision.](#)
 - [A Water Utility Availability Response letter.](#)
 - Stormwater Technical Information Report, including all model outputs
 - If requested by the City Engineer, stormwater modeling program files
 - For resubmittals, a response to the comments that addresses each City comment from a prior review

B. Transportation/Traffic Impact Analysis (TIA)

- 1.) A TIA will be required if the project generates more than 10 p.m. peak hour trips or more than 100 daily trips. The TIA shall evaluate surrounding roadways and intersections and any improvements found to be necessary will be required to be completed. The applicant's traffic engineering should submit a scoping memo to the ~~Public Works Director/~~ City Engineer [or designee](#) with a proposed scoping of the TIA. Work should not proceed on a TIA without the approval or modification of the TIA scope by the ~~Public Works Director/~~ City Engineer [or designee](#).
- 2.) If a TIA is not required, a traffic memo estimating the number of average daily and p.m. peak hour project trips based on the Institute of Transportation Engineers (ITE) manual will be required for the purposes of assessing Traffic Impact Fees. This memo will be used in lieu of a full TIA to track trips in PUDs or Development Agreement site plans where the “build-out” trips have been vested, as well as for assessment of Transportation/Traffic

Impact Fees. This memo should also include supporting documentation if adjustment(s) from ITE trip generation rates are requested.

- 3.) Requests to modify the number of daily trips subject to Traffic/Transportation Impact Fees (TIF) shall be submitted to the City Engineer ~~/Public Works Director~~ or designee. Requests shall be in a technical memo. Factors to be considered can include site trips which are internalized in a larger site or neighborhood context and thus do not impact the collector/arterial system, as well as connections between sites of compatible uses where shared or joint access may trips internalize trips that would otherwise use the collector or arterial system. Requests to waive assessment of traffic/transportation impact fees altogether will not be considered.
- 4.) Traffic/transportation impact fee credits can be calculated in one of three ways:
 - Proportionate share of the TIF eligible road construction completed based on the currently-adopted Capital Facilities Plan/TIF spreadsheet; or
 - Calculation of actual costs of the improvement(s) completed on TIF eligible corridors minus the cost of the same facility if it were built as a local access street. The difference is the “public” cost of the facility and will serve as the amount of TIF credits to be issued.
 - Determination as part of a Development Agreement approved by City Council.
 - The issuance of TIF credits is by decision of the ~~Public Works Director~~ City Engineer or designee.

1.06 General Requirements for Engineering Plans

A. Design Plan Format

- 1.) The plans shall be submitted in PDF format, with standard print sizes of 22-inch x 34-inch or 24-inch x 36-inch sheets. Plans of any other size will not be reviewed or accepted without prior written approval from the City Engineer.
- 2.) All sheets shall have a 1.5-inch x 3.0-inch blank space in the upper right-hand corner for batch stamping of plans by the City and Clark-Cowlitz Fire Rescue.
- 3.) Title/Cover sheet to include project name, vicinity map, name and mailing address of developer/owner and engineering firm, general notes, notice to excavators, sheet index, and a signature block for Clark Regional Wastewater District and Clark-Cowlitz Fire and Rescue. If the project is outside of the City water service area, a signature block for Clark Public Utilities is also required. Vicinity maps shall show the location of the project in respect to the nearest major street intersection.
- 4.) A north arrow shall be shown on each plan view sheet of the plans and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.
- 5.) Copies of each applicable City Standard Detail - Reference each City Standard Drawing by number on the plan sheets.
- 6.) The scale shall be 1-inch = 10 feet, 20 feet, 30 feet, 40 feet, or 50 feet horizontally for all drawings except structural details. A different scale may be used on drawings and shall be 1-inch = 2 feet, 3 feet, 4 feet, 5 feet, or 10 feet vertically. Scale shall be shown with north arrow at a minimum.

- 7.) Letter size shall not be smaller than 0.12 of an inch high on full-size plan sheets.
 - 8.) The location and elevation of a National Geodetic Survey, United States Geological Survey, Clark County, or City of Ridgefield bench mark shall be referenced on the plans. The datum shall be Clark County Datum NGVD 1929(47). No other datum shall be used without permission of the City Engineer. Temporary control bench marks and elevations shall also be shown on the plans.
 - 9.) A title block shall appear on each sheet of the plan set and shall be placed in the lower right-hand corner of the sheet, across the bottom edge of the sheet, or across the right-hand edge of the sheet. The title block shall include the names of the project, the engineering firm, the owner, the sheet title, and the sheet number.
 - 10.) The seal of the registered Washington Professional Engineer responsible for preparation of the plans shall appear on each sheet.
 - 11.) The description and date of all revisions to the plans shall be shown on each sheet affected, and shall be approved and dated by the registered Professional Engineer of record as evidenced by an original signature or initial. The location of all revisions on each plan sheet shall be clearly identified through the use of "clouds", triangles or some other visible feature.
 - 12.) Through use of standard drafting symbols, indicate the location and direction of view for all sections.
 - 13.) The following statement shall appear on the cover sheet of all plans at a location immediately above, below or adjacent to the developer engineer's professional stamp - **"I hereby certify that these plans, and related design, were prepared in strict conformance with the City of Ridgefield Engineering Standards for Public Works Construction, as modified by Approved Modification, Variance, or Condition of Approval"**.
- B. Site Development Plans shall be organized as follows:**
- 1.) Title sheet.
 - 2.) Approved preliminary plat or approved site plan.
 - 3.) Existing Conditions Plan - A topographic survey be performed on and within 100 feet of the site and is to include, but not limited to the following; topography at 2 foot contour interval; contours shall be labeled with elevations at ten foot interval, watercourses (intermittent creek, streams, Rivers, etc.) and areas prone to flooding; FEMA designated floodplains and floodway; designated Shoreline areas; water bodies and known wetlands, wetland delineated boundaries and buffers; unstable slopes and landslide hazard areas; significant habitat areas and buffers; significant historic sites; Show layout and dimensions of all existing (parent) parcels; location of adjacent property lines; location of any existing building(s) on the site and use; location and width of existing easements for access, drainage, utilities, etc.; name, location, width of existing right-of-way, centerline and right-of-way radius of existing roadways that abut the site; name location, width and surface material (e.g. gravel, asphalt or concrete) of roadway and easement (private and public); location and width of existing driveways and those driveways across the street; location and width of existing pedestrian and bicycle facilities on and within 100 feet of the site; location and direction to nearest fire hydrant; location of existing sewage disposal systems and wells on site and within 100 feet of the site (as available from the city or health district) This sheet shall also note the source of information, date of field work, datum and benchmark, and location of original document.

- 4.) Traffic control plans. See Section 1.07 for requirements of these plans.
- 5.) Grading and erosion control plan with maximum existing and proposed contour intervals of 2 feet. The extent and limits of sensitive lands and buffers, as defined by the City Municipal Code shall be delineated on this sheet.
- 6.) Street and storm sewer, showing existing and finished contours at 2-foot intervals. Storm sewer information may be included on water and sewer sheets where practical. In all cases, all proposed utilities shall be shown on each utility sheet, although notes and call-outs may be segregated per individual sheet.
- 7.) Street and storm sewer profiles showing vertical curve information and stormwater invert and rim elevations. Sanitary sewer, water and other private utilities shall be shown for reference including crossings within profiles.
- 8.) Stormwater detention facility plan, sections, details and calculations showing cell and pond volumes and critical storm elevations of the Water Quality, 2-yr, 10-yr and 100-yr modeled storm events.
- 9.) Sanitary sewer and water plan sheets, including service, valve, and fire hydrant locations. Sanitary sewer and water plan sheets may be separate if needed for clarity or where required by the City Engineer.
- 10.) Water and sewer profiles showing locations of water air releases and invert and rim elevations of sanitary sewer pipes. Sanitary sewer and water profile sheets may be separate if needed for clarity or where required by the City Engineer. Storm sewer and other private utilities shall be shown for reference including crossings within profiles.
- 11.) Landscape plan including plants, trees, sidewalks, bikeways, trails, driveways, retaining walls, irrigation, and lighting, outside of parks and trail facilities. Street light, signage and water meter locations shall be shown for conflict identification.
- 12.) Lighting and Photometric plans designed by a licensed electrical engineer or electrician. Street light location, spacing, and type should be called out.
- 13.) Signage and striping plan showing locations and types of street signage and striping. This plan may be included on other sheets provided that it is legible.
- 14.) Parks, Trails, and Recreation plans including trails, playgrounds, amenities and fixtures, signage, landscaping, and maintenance and safety requirements (see Volume 3 for more information).

1.07 Requirements for Traffic Control Plans

A. General Requirements

- 1.) Projects that are not conducted by the City of Ridgefield Public Works Department shall require an encroachment permit when work will occur within or impact existing roadways. As part of the permit, site specific traffic control plans shall be prepared.
- 2.) Site specific Traffic Control Plans are required to be included in Final Engineering submittals when planned work will occur within existing roads.
 - a. The plans will be used to prove construction feasibility and identify other potential risks or concerns with adjacent developments, improvements, projects or safety
- 3.) Traffic Control Plans shall include:

- a. Information on roadway speeds, widths, and tapers
 - b. Information on detours and durations
 - c. Information for pedestrian and bicyclist routing through or around the construction zone
- 4.) City Engineer has authority to waive or modify requirements regarding traffic control for this section.
 - 5.) Applicant may request a deferred Traffic Control Plan submittal to the City Engineer. If approved, all Traffic Control Plans shall be submitted following requirements of Section 1.12 and shall be submitted, reviewed and approved prior to the Pre-Construction meeting.

B. Requests for Lane or Road Closures

- 1.) Planned work in the public right-of-way requires an encroachment permit (non-City projects) or approval by the ~~Public Works Director~~ City Engineer or designee (City projects).
- 2.) Requests for planned lane or full road closures lasting 24 consecutive hours or more are subject to City Public Works Policy 24-01 or amendments thereto. This policy will apply in all cases where there is a planned lane or full road closure on the City's collector or arterial road system of duration lasting at least one day (24 hours). For emergency situations such as snow/ice events, utility emergencies, slides or other unexpected event(s), those situations will be handled on a case-by-case basis.
- 3.) Requests for single lane closures of less than 24 consecutive hours are subject to work hours restrictions. For lane closures on school days on Hillhurst Road, Royle Road or Pioneer Street, work impacting traffic shall occur between the hours of 9AM and 2:30PM or as otherwise approved by the ~~Public Works Director~~ City Engineer or designee.
- 4.) Requests for full road closures are subject to City Public Works Policy 24-01 and require approval of both the ~~Public Works Director~~ City Engineer or designee, and the City Manager.
- 5.) All requests considered under this Policy must be made at least three (3) weeks prior to the planned closure in order for the City to convene to develop a plan with appropriate notice to all affected agencies.

1.08 Requirements for Public and Private Street Improvement Plans

A. Plan Views shall show the following:

- 1.) Right-of-Way, property, tract, and easement lines (existing and proposed). Tract naming shall be consistent with the naming on the preliminary plat or preliminary site plan.
- 2.) Subdivision name, lot numbers, street names, and other identifying labels. Lot numbering shall be consistent with the approved preliminary plat. Subdivision and street names are subject to review and approval of the City Community Development Director.
- 3.) Location and stationing of existing and proposed street center lines and curb faces.
- 4.) Horizontal alignment and curve data of street center lines and curb returns.
- 5.) Existing underground utilities and trees over 6-inches in diameter within and extending 50 feet beyond the construction limits.

- 6.) Location of any designated heritage trees.
- 7.) Location of existing buildings, wells, septic tanks, drain fields, fuel tanks, and any other buried structures. An American Land Title Association (ALTA) survey shall be required for at least 100 feet surrounding any of the above items to remain.
- 8.) Match lines with sheet number references.
- 9.) Street stationing to be noted at a minimum of 100-foot intervals.
- 10.) Top of curb elevations along curb returns at quarter-delta's, and at 100-foot stations.
- 11.) Location of the low points of street grades and curb returns.
- 12.) Sidewalk locations. This shall include ramps, transitions in location or width, and relationship with driveways.
- 13.) Crown lines along portions of streets transitional from one typical section to another.
- 14.) Center line stationing of all intersecting streets.
- 15.) Location and description of existing survey monuments, including but not limited to: section corners, quarter corners, donation land claim corners, and City bench marks.
- 16.) Location of proposed street intersection monument boxes.
- 17.) FEMA designated 100-year flood plains and flood ways, or areas of flooding during a 100-year storm event.
- 18.) Wetland areas and storm water quality undisturbed corridors (buffer strips).
- 19.) Legend.
- 20.) Any additional information that the City deems necessary.

B. Profile Views shall show the following:

- 1.) Stationing, elevations, vertical curve data (including curve k factors), and slopes for center of streets or top of curbs. For off-set or superelevation cross-sections, both curbs shall be profiled. Where curbs are not to be constructed, center line of street and ditch inverts shall be shown.
- 2.) Original ground along the center line and if necessary, at the edges of the right-of-way if grade differences are significant.
- 3.) Center line, top of curb or edge of pavement, and gutter flow lines of existing streets for a distance of at least 300 feet each way at intersections with proposed streets. For stub streets that may be extended in the future, the vertical alignment shall be designed for at least 300 feet beyond the scope of the proposed construction. At the discretion of the City Engineer, additional design information concerning the vertical and horizontal alignment of future street extensions may be required.
- 4.) Vertical alignment of streets, including existing center line monumentation.
- 5.) The top of curb for all cul-de-sacs, eyebrows and curb returns.
- 6.) Existing drainage facilities, including off-site facilities, upstream and downstream that affect the design (i.e., downstream restrictions that back water onto project site). In addition, base flood elevations shall be shown on the profile.

- 7.) Profiles for revised ditch and creek flowlines shall extend a minimum of two hundred (200) feet beyond the project, both upstream and downstream. Typical cross sections at fifty (50) foot intervals shall also be submitted.
- 8.) Designate structures using alpha or numeric labels on profiles to correspond to plan view notation.
- 9.) All existing and proposed sanitary, water, storm lines and other utilities in parallel to or crossing the profile.

1.09 Site Grading Plan

The City of Ridgefield requires a site grading plan as part of the Application for any development that involves the excavation or fill of greater than fifty (50) cubic yards of material. Grading contours (existing & proposed) shall be at no more than 2 foot intervals, shall be labeled with elevations at no more than ten foot intervals, and shall extend off-site a minimum of 50 feet. This sheet shall also note source of information, date of field work, and location of original document, the calculated cut and fill quantities, location of stripping stockpile location of critical areas and buffers, and any additional information that the city deems necessary.

A geotechnical evaluation report must be performed and referenced on the plan for site specific geotechnical recommendations. Plan must define recommendations to be followed from report. A copy of the report must accompany the plan for review and approval by the City Engineer. A modification to this requirement must be submitted to the City Engineer for approval.

If the site is greater than one acre in size, the permit number issued by the Department of Ecology for coverage under the NPDES Construction General Permit shall be noted on the plans (WAR#).

All soil disturbing construction activity must adhere to the requirements of the City of Ridgefield Engineering Standards, approved Erosion Control Plans, applicable state requirements. A detailed erosion control plan shall be shown in conjunction with the site grading plan.

1.10 Erosion Control Plans

A. Required Components

Erosion control plan drawings shall, at a minimum, include the following:

- 1.) Locations, types and applicable dimensions of erosion control measures.
- 2.) Applicable details of erosion control measures showing full dimensions and construction information.
- 3.) Existing and proposed ground contours.
- 4.) Locations and sizes of existing and proposed drainage pipes and channels (labeled as such and with arrows indicating flow direction).
- 5.) Construction site entrances/exits.
- 6.) Applicable erosion control notes and standard details.
- 7.) If the site erosion control plan includes sediment traps or ponds, the applicant shall also submit calculations used for determining trap or pond sizing.
- 8.) All planned stockpile locations and associated erosion control measures for stockpiles.

B. Design

Erosion control measures shall be designed in accordance with the Western Washington Manual.

C. Erosion Control Approval

Approval of a construction erosion control plan by the City does not relieve the applicant's responsibility to ensure that erosion control measures are constructed and maintained to contain sediment on the construction site. Erosion control measures shown are considered the minimum required and additional measures may be required as directed by the City Engineer or Development Inspector.

1.11 Requirements for Utility Plans (Water, Storm Drainage)

A. General Requirements

- 1.) In plan view, location, stationing, materials, size, of all proposed utility lines (water, storm, sanitary). Location of all fire hydrants. Stationing shall be located in relationship to the street stationing at all manholes or other key locations.
- 2.) Show all proposed manholes, inlets, and catch basins with all invert and top elevations.
- 3.) For drainage plans, show existing drainage facilities, including off-site facilities, upstream and downstream that affect the design (i.e., downstream restrictions that back water onto project site). In addition, base flood elevations shall be shown on the profile.
- 4.) Designate structures using alpha or numeric labels on profiles to correspond to plan view notation. For water plans, each fitting/valve shall have attachment type listed (e.g. FL, MJ, FL x MJ, etc.).
- 5.) For water plans, provisions for cross-connection control must be clearly shown on the plans, including any retro-fitting of existing water service connections and existing auxiliary water supplies, conversions to City of Ridgefield water service that are required as a condition of development approval, upgrading of existing service connections by replacement of same, and any other cross connection control required by state and local rules and codes.
- 6.) All lengths and dimensions shall be horizontal distances, no slope distances on plans.
- 7.) Indicate type of pavement restoration required (if working in existing streets).
- 8.) Dimension existing and new utility locations from right-of-way line and/or property line. For water plans, drawings shall reference distance to nearest existing valve/hydrant from new point of connection to existing water main.
- 9.) On plans show existing manholes or give reference distances to existing manholes near project including manhole number and invert/rim elevations
- 10.) General construction notes must be included on first plan sheet. Remove notes that don't apply and add additional notes to the list if necessary.
- 11.) List vertical datum on plan and show benchmark to be used for vertical control during construction.
- 12.) The developer/contractor is responsible for sending a letter and preliminary plan to existing utility companies to inform them of new construction and requesting as-built information for incorporation into plans. At a minimum the following utilities shall be contacted:
 - Clark Regional Wastewater District
 - Cable television

- Natural gas
- Power
- Telephone
- Clark Public Utilities (water) if project is outside of the Ridgefield water service area

13.) Draft plans shall be sent to the above listed utilities to allow coordination of projects.

B. Plan View

- 1.) List pipe length, size and material alongside of pipe, e.g. 150 l.f. – 8" PVC.
- 2.) Pipe length is to be based on horizontal distance between centers of manholes.
- 3.) Indicate direction of flow with arrows on end of pipe entering manhole.

C. Profile View

- 1.) List pipe length, size, material and slope to 4 decimal places (ft. per ft.), e.g. 150 l.f. – 8" PVC s=0.0125.
- 2.) Slope based on invert elevation out of upstream manhole, invert elevation into downstream manhole, and horizontal distance between center of manholes.
- 3.) Provide profiles for existing and proposed storm sewer and sanitary sewers. Profiles shall also be provided for new sewer force mains and new water mains.
- 4.) Show all existing and proposed sanitary, water, storm lines and other utilities crossing the profile.
- 5.) For drainage plans, profiles for revised ditch and creek flowlines shall extend a minimum of two hundred (200) feet beyond the project, both upstream and downstream. Typical cross sections at fifty (50) foot intervals shall also be submitted.

1.12 Requirements for Supplemental Submittal Information

A. Technical Information Report (TIR)

The TIR shall be a comprehensive report that contains all technical information and analysis necessary to complete the final engineering plans based on geotechnical, hydrologic, hydraulic, and water quality design. The TIR shall be comprised of the minimum following items:

- Table of Contents
- Project Overview
- Summary of Minimum Requirements and how each is met
- Flow control analysis and design
- Runoff treatment analysis and design
- Source control
- Wetland protection
- Conveyance system analysis and design
 - Where inlet spacing or roadway width parameters are changed from the standard, a spread analysis will be required to be performed meeting requirements of the WSDOT Hydraulics Manual (current edition).

- Reports used in design and reference for the design
- Operations and Maintenance manual
- Appendices
 - This section shall include all program calculation outputs, runoff drainage systems, areas contributing flow to each inlet must be computed separately and each inlet with contributing area shall be designated and shown on an accompanying contour map work sheet, basin/catchment maps conforming with model and plans in a way that clearly ties all elements together, initial time of concentration calculation with assumptions listed and charts or nomographs used shall be included with drainage calculations.

A table of the primary parameters used in modeling shall be included in the report. This table shall include, for and pre- and post- development, at a minimum, time of concentration, impervious area percentages, average curve numbers, basin areas, and flows.

The TIR shall address all minimum requirements as required by the 2019 Stormwater Management Manual for Western Washington, and as amended herein Chapter 3.

B. Other information to be shown on the construction drawings or the other submittals include:

- 1.) The design assumptions for each street (ex: traffic coefficient, R-value).
- 2.) The design elements such as:
 - Street classification;
 - Design speed;
 - Superelevation;
 - Average Daily Traffic (ADT) or Design Hourly Volume (DHV).
- 3.) Structural construction plans and the necessary calculations shall be submitted for proposed structures (ex: walls, box culverts, bridges).
- 4.) Any additional information that the City Engineer deems necessary to review the plans and assure compliance with design standards.

C. Detail sheets.

- 1.) Detail sheets shall be provided showing all standard details.
- 2.) City of Ridgefield standard details shall be used when available.
- 3.) WSDOT standard plans may be used for any item for which the City does not have a detail.
- 4.) If a detail from another agency is desired for use, it shall be requested and approved via the Design Modification Process (see Section 1.17).

D. Standard Notes.

The following standard notes in their entirety shall be included on the first or second sheet in the plan set. The following shall be the minimum required notes to be included:

- 1.) Construction shall conform to the requirements of the *City of Ridgefield Engineering Standards, Volume 2 – Construction Specifications and Details*, the latest edition of the APWA/WSDOT Standard Specification for Road, Bridge, and Municipal Construction, and the Land Use Conditions of Approval. It shall be the sole responsibility of the applicant

and the professional civil engineer of record to correct any error, omission, or variation from the above requirements found in these plans.

- 2.) Approval of plans for an individual grading permit by the City does not constitute an approval of any other construction (e.g. domestic water conveyance, storm drainage, gas, electrical, etc.) unless specifically noted otherwise within the approval.
- 3.) Before commencement of any construction or development activity, a preconstruction meeting must be held between the City, Clark Regional Wastewater District, the applicant, the applicants consulting engineer and construction representatives. Additionally, all private utilities within the project limits or performing work for the project shall also be included, including but not limited to: Clark Public Utilities District, NW Natural, and all communication companies (as applicable).
- 4.) A copy of these approved plans must be on the job site whenever construction is in progress.
- 5.) In accordance with Ridgefield Municipal Code Section 9.14.010, hours of permitted construction are limited to 7 a.m. to 10 p.m. Monday through Friday and 9 a.m. to 6 p.m. Saturday, Sunday and City observed holidays. Each violation shall be a civil noise infraction and shall result in a \$500 civil fine. Requests for extended or modified hours of construction must be submitted to the ~~Public Works Director~~ City Engineer or designee for review and approval at least two business days in advance.
- 6.) It shall be the Applicant's/Contractor's responsibility to obtain all construction easements and/or right of entries prior to construction work.
- 7.) Vertical Datum shall be Clark County Datum NGVD 1929(47) unless otherwise approved by the City Engineer.
- 8.) All utility trenches shall be backfilled and compacted to 95% maximum density as determined by AASHTO T-180.
- 9.) All minimum compaction of materials for roadways shall be as follows:
 - a. Subgrade within the roadway prism shall be backfilled and compacted as determined by AASHTO T-180. All roadway aggregate base rock within the roadway prism shall be compacted to 95% maximum density as determined by AASHTO T-180.
 - b. Asphalt compaction shall be at least 92% based on a Rice theoretical maximum density, as determined in conformance with AASHTO T 209, as modified by WSDOT.
- 10.) The leveling course and wearing course of asphalt concrete (AC) for streets shall at a minimum be WSDOT Standard Hot Mix Asphalt Class ½-inch, PG 58H-22, except for arterials which shall be Class ½-inch and PG 58V-22.
- 11.) Open cutting of existing roadways is not allowed unless specifically approved by the City and noted on these approved plans. Any open cut shall be restored in accordance with the standard trench restoration details and notes.
- 12.) Any proposed traffic control plans are subject to approval as defined in Section 1.07 above. Requests shall be emailed to traffic@ridgefieldwa.us a minimum of five (5) business days prior to implementation for work within Pioneer Street, Hillhurst Road, or Royle Road. Traffic control proposed on other City streets shall be emailed a minimum of two (2) business days prior to implementation. The email shall contain the following information:
 - Project Name

- Traffic Control Plan
- Impacted Streets
- Date(s) of proposed traffic impact
- Times of proposed traffic impact
- Proposed impact (i.e. lane closure with flagging, road closure with detour, shoulder work, intermittent flagging).

Proposed traffic control and implementation is **not** approved until a response email with approval for execution of the submitted information is received from the City. City may approve with conditions or require corrections be addressed and resubmitted for review and approval.

- 13.) The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, flaggers, and any other needed actions to protect the life, health and safety of the public, and to protect property in connection with the performance of work covered by the contractor. Any work within the traveled right-of-way that may interrupt traffic flow shall require at least one flagger for each lane of traffic affected. Section 1-07.23 "Traffic Control" of the WSDOT Standard Specifications shall apply in its entirety.
- 14.) Upon discovery of potential, known or unknown archaeological resources at the subject site prior to or during on-site construction, the developer, Contractor, and/or any other parties involved in construction shall immediately cease all on-site construction in accordance with RCW 27.53.060.

1.13 Review Procedure

Electronic copies of complete draft plans shall be submitted to the City for review. Plans shall be complete and shall be stamped and signed by the developer's engineer. The complete set of plans shall include planning sheets (i.e. landscape, planting, site plan, illumination, etc.) combined with engineering sheets. Electronic copies of supporting information and documentation, such as technical information report, geotechnical report, preliminary plat, and water system calculations, shall also be submitted.

Electronic copies of supplemental review documents including but not limited to Geotechnical Report, Critical Area and Mitigation Report, and current NPDES Permit for the project, U.S. Army Corps of Engineers Permits and/or Ecology Wetland impact permits, WSDOT concurrence/approved documents including hydraulic reports and plans, and any other related or applicable permit shall also be submitted for review and confirmation approvals have been provided.

Upon completion of the detailed review by the City, the City will return an electronic set of redlined plans and documents. After the developer's engineer has completed all revisions, an electronic copy of all revised plans and supporting information, as well as a comment response letter shall be returned to the City on each iteration of plan review.

Following concurrence for approval of draft plans and calculations by the City Engineer and following the signing of approval of the cover sheet by Clark Regional Wastewater District, Clark-Cowlitz Fire Rescue, Clark Public Utilities (as applicable), and WSDOT (as applicable), the developer's engineer shall submit the complete compiled set of final plans for Planning/Community Development (site plan and addressing) and the City Engineer's approval signature. The complete compiled set shall include any previously approved sheets from Community Development. The City Engineer will stamp and approve the full set only after Planning has stamped approval of the site plan.

Plan review priority will be given to plans submitted for final review. [This plan review and approval is valid for three \(3\) years for Commercial \(non-residential\) and five \(5\) years for Residential from the date of Engineering Plan approval. Extensions to the permit may be made by the City Engineer in extenuating circumstances, upon written request by the Developer, but may not be extended past the expiration date of Preliminary Land Use approval.](#)

Plan approval means that the plans have been reviewed for reasonableness and compliance with minimum City specifications and standards. This approval does not supersede those standards and specifications, unless specifically varied by the City. Plan approval does not relieve the developer's engineer from responsibility for errors, omissions or deficiencies in the plans.

Please note that Final Engineering plan approval for construction cannot be released until all other reviewing agencies have provided approvals and/or permits.

Once engineering approval has been received, the applicant shall identify a contractor and contact the City's Development Review Coordinator to schedule a preconstruction conference (see Section 1.02 of Volume 2 for details on the preconstruction conference).

1.14 As-Built Drawings

Following completion of construction, the developer's engineer shall submit an electronic copy of the as-built drawings in PDF format to the City for review. After City review and approval of the as-built drawings the developer's engineer shall submit one CD containing electronic as-built drawings in PDF and AutoCAD DWG file formats. DWG files are to include project linework base files for hardscape and utility improvements.

As-built drawings shall contain any and all revisions to the previously approved construction plans. The cover sheet of the as-builts shall be accompanied by the following statement next to a new stamp and signature from the developer's engineer:

"I, (Name of Developer's Engineer), certify that I, or personnel under my supervision, have reviewed field data from a registered professional land surveyor for the stormwater and water utilities as show in these record drawings. According to the horizontal and vertical datum, dimensions and grades which can be verified after construction, the connected stormwater and water utilities meet the standards of the City of Ridgefield."

As-built information shall be obtained and provided to the developer's engineer by a surveyor licensed in the State of Washington. The as-built drawings shall include all the approved plan information plus the revised data as obtained by the as-built survey and shall include the landscaping & irrigation and lighting & electrical plan sets. The design information shall be lined out where revised by the addition of the as built data. All as built information shall be made electronically; no handwritten information will be accepted. Additional as built information may be required by the City Engineer.

Each sheet of the as-constructed drawings, including the cover sheet, shall be stamped "As-Built" or "Record Drawing", and signed and dated by the developer's engineer. This signature constitutes a certification that the public and private improvements, grading, and other elements of the engineered drawings have been completed in accordance with the City approved plans and to the standards of the City.

Submission of as-built drawings shall be made prior to final inspection of a completed project.

1.15 Professional Qualifications

Professionals in the technical fields of Civil Engineering, Electrical Engineering, Geotechnical Engineering, Landscape Architecture, Soils Engineering, Structural Engineering, and Surveying who prepare or are responsible for the preparation of drawings, plans, specifications, technical reports, etc. for the process of obtaining required permits/approvals shall be currently licensed or registered in the State of Washington and qualified by both experience and educational background in the specific technical areas as warranted by the specific needs of the proposed development project.

1.16 Changes to Standards

From time to time changes may be needed to add, delete, or modify the provisions of these standards. The City Engineer may ~~propose~~ approve technical changes to these Standards ~~and upon approval of the Public Works Director, they shall become effective and shall to~~ be incorporated into the existing provisions. Comprehensive revisions to the Standards shall be proposed by the City Engineer ~~and Public Works Director~~ and adopted by the City Council.

1.17 Design Modifications Process

A. Submittal

Requests to modify City Standards shall be submitted in writing by the developer's engineer, to the City Engineer. This written request shall state the desired modification(s), the reason(s) for the request(s) and a comparison between the specification(s), standard(s), and the modification(s).

Any request for modification or variance of City Standards should be documented with reference to nationally accepted specifications/standards.

B. Review

The request to modify shall be reviewed by the City Engineer, who shall consult the appropriate review authorities and make one of the following decisions:

- 1.) Approve as is,
- 2.) approve with changes,
- 3.) or deny with an explanation.

The modification, if approved, is for project specific use. Approval of a request shall not constitute a precedent.

C. Appeal

The applicant may appeal the City Engineer's decision to the City Manager.

D. Criteria for Modification of Standards

The City Engineer may grant a modification to the adopted specifications or standards when any one of the following conditions are met:

- 1.) The specification or standard does not apply in the particular application.
- 2.) Topography, right-of-way, or other geographic conditions impose an economic hardship on the applicant and an equivalent alternative which can accomplish the same design is available that does not compromise public safety or accessibility for the disabled.
- 3.) A change to a specification or standard is required to address a specific design or construction problem which if not enacted will result in an undue hardship.

1.18 Errors and Omissions

At the discretion of the City, any significant errors or omissions in the approved plans or information used as a basis for such approvals may constitute grounds for withdrawal of any approvals and/or stoppage of any or all of the permitted work. It shall be the responsibility of the developer to show cause why such work should continue and make such changes in plans that may be required by the City before the plans are reapproved.

1.19 Railroad Crossings

A. General

Crossings of railroad rights-of-way shall be done in a manner which conforms to the requirements of the railroad having jurisdiction. If any bonds and/or certificates of insurance protection are required, they shall be furnished by the Contractor or Owner to the railroad company with the City as an additionally-named insured.

B. Permits or Easements

Crossing agreements, permits, and/or easements for such crossings will be obtained by the applicant and all the terms of such permits or easements shall be met by the Owner and Contractor.

1.20 Penalties

Failure to comply with these Standards will be cause for withholding or withdrawing approval of plans or plats, forfeiture of bond, withholding Temporary and/or Final Certificate of Occupancy, and/or other penalties as provided by law. Public improvements constructed without approved plans may not be accepted by the City and may be subject to removal and reconstruction at the discretion of the City Engineer or ~~Public Works Director~~ designee.

CHAPTER 2

STREETS

CHAPTER 2 - STREETS

2.00 Functional Classification

The functional classification of existing and proposed roads is established by the City on an individual basis using the existing land use and existing operational characteristics. Ridgefield classifies roads and streets as follows:

A. Major Arterials.

These facilities are the supporting elements of both the principal routes and collector systems. Major arterials, in combination with principal routes, are intended to provide a high level of mobility for travel within the region. All trips from one sub-area through an adjacent sub-area traveling to other points in the region should occur on a major arterial or principal route. No direct land access is permitted on to major arterial unless no other access is available. Where permitted, shared access between lots may be required.

B. Minor Arterials.

The minor arterial system complements and supports the principal and major systems but is primarily oriented toward travel within and between adjacent sub-areas. An adequate minor arterial system is needed to ensure that these movements do not occur on principal routes or major arterials. These facilities provide connections to major activity centers and provide access from the principal and major arterial systems into each sub-area. No direct land access is permitted on to minor arterial unless no other access is available. Where permitted, shared access between lots may be required.

C. Collectors.

The collector system is deployed nearly entirely within sub-regions to provide mobility between communities and neighborhoods or from neighborhoods to the minor and major arterial systems. An adequate collector system is needed to ensure these movements do not occur on principal routes or major arterials. Emphasis is on collection and distribution of trips within an arterial grid and direct access from parcels is limited to the extent possible. Subcategories of collectors include standard collectors, scenic collectors (see below), campus collectors (applies to Union Ridge Parkway through Clark College campus area only) and industrial/commercial collectors.

D. Local Streets.

The local street system is used throughout developed areas to provide for local circulation and direct land access. It provides mobility within neighborhoods and other homogenous land uses and comprises the largest percentage of total street mileage. In general, local traffic should not occur on major arterials and principal routes. Subcategories of local streets include residential access and residential local.

Residential access streets shall be required where the local street system connects to higher classification streets such as collectors or arterials, on local streets that will serve more than 50 lots, and on local streets that will serve more than one current or future development unless otherwise approved by the City Engineer.

Industrial local access streets provide circulation and access within commercial or industrial developments and centers and access between individual sites and lots.

E. Scenic Collector

Scenic collectors are collector streets which pass through scenic or natural areas with topographical or habitat constraints that preclude their widening to the full collector standard. They are narrower cross sections and have lower design speeds than collector streets. Reiman Road, Gee Creek Plateau, and Carty Road in the Carty Road Subarea are the currently designated Scenic Collectors on the City's functional classification system.

2.01 General Requirement for Layout

The City's Comprehensive Plan states that future street construction will encourage connectivity. Additionally, the City has adopted a Complete Streets Policy to encourage connectivity and accessibility for pedestrians and bicyclists. Street sizing for arterials and collectors assumes that the transportation system will encourage non-motorized transportation. To meet the planning objectives, the City has established a standard of at least eight (8) through streets per mile on local streets to allow neighborhood trips on a smaller scale. The City's objective is to impose an average spacing for new local streets of five hundred (500) feet (a 500-foot maximum grid) within all new developments and to the limits of the entire parcel of property being developed.

Layout of new development will provide the capability of extending future streets through adjacent parcels by having streets proposed for that development extended to the limits of the property and located so as to provide a spacing of 400 to 600 feet. Where this requirement is not feasible due to topography, zoning constraints, or critical area impacts, an 8-foot wide paved trail consistent with the ~~type 3 standard~~ standards for multi-modal trails, specified in Volume 3 of these standards, can be substituted for the street if approved by the City Engineer. Said trail shall follow the general grid pattern of the street layout (500 foot grid) and shall extend from the where said streets are not capable of being extended to the limits of the property due to topographic constraints, or shall be established mid-block to provide pedestrian connectivity between parallel streets. To meet the through street planning objectives, streets, bikeway, or multi-modal trails shall be designed and constructed to extend to the limits of the property with the all costs borne by the developer of the property without reimbursement by the City.

2.02 Access

Access to public and private streets shall conform to the requirements listed herein. The City Engineer ~~or designee and the Public Works Director~~ shall have the authority to limit access and designate access locations on public and private streets under the jurisdiction of the City. Access to streets and highways under Clark County or State of Washington jurisdiction must be formally approved by those entities at the applicant's initiative and expense.

2.03 Street Cross Sections

- A. Street Cross sections are defined by the functional classification of the road. Tables 2.03A through 2.03C list the design parameters for each of the functional classifications. Required street cross sections can be found in the Transportation Details which are an appendix to this Volume. It should be noted that public utility easements beyond the right-of-way are typically required.

All new roadways shall be provided with a centerline crown with an allowable cross slope between 2% and 4%.

B. Alleys.

Alleys may be used to provide alternative access to lots only under unusual circumstances as approved by the City Engineer. Table 2.03B provides alley requirements. Alleys may not be used to provide primary access to lots.

Alleys must be provided with a gutter or other means for collecting storm water runoff, and must meet the requirement of Section 503 of the International Fire Code (IF

Table 2.03A – Street Cross Sections

Parameter	Roadway Classification								
	Major Arterial	Minor Arterial	Downtown Minor Arterial	Standard Collector	Industrial/Commercial Collector	Scenic Collector	Industrial Local	Residential Access	Residential Local A
Right-of-Way	100	80	60	70	70	60	60	60	48
Total Roadway Pavement	52	46	40	46	46	24	42	36	28
Number of Drive Lanes	2	2	2	2	2	2	2	2	2
Width of Drive Lanes	12/14	12	12	10	12	12	14	10	10
Number of Turn Lanes/Median	1	1	0	0	1	0	1	0	0
Width of Turn Lanes/Median	12	12	0	0	12	0	14	0	0
Number of Parking Lanes	1	0	2	2	0	0	0	2	1
Width of Parking Lane	8	0	8	8	0	0	0	8	8
Number of Bike Lanes ¹	1	2	0	2	2	0	0	0	0
Width of Bike Lane	6	5	0	5	5	0	0	0	0
Number of Sidewalks ^{1,2}	1	2	2	2	2	1	2	2	2
Width of Sidewalks	6	6	10	6	6	6	6	5	5
Number of Planter Strips ³	1	2	0	2	0	0	0	2	2
Width of Planter Strip (incl. curb)	7	11	0	6	0	0	0	7	5
Design Speed	45	40	25	35	35	25-35	25	25	20-25

Notes:

1. Major arterials include one bike lane, one sidewalk, and one 10 -foot multimodal trail. See Standard Detail T-2.1.
2. Sidewalks on arterials are widened to 10 feet when adjacent to commercial zoned areas.
3. Major arterials include one planter strip and one 35-foot landscape area with a 10 -foot multimodal trail. See Standard Detail T-2.1
4. Design speed shall be established for each project or development proposal by the City Engineer
5. Certain primitive, non-arterial roads shall have a design speed of 20-25 mph.

Table 2.03B – Gee Creek Plateau and Carty Road Subarea Street Cross Sections

Parameter	Roadway Classification	
	Gee Creek Plateau Scenic Collector	Carty Road Subarea Collector
Right-of-Way	70	80
Total Roadway Pavement	28	28
Number of Drive Lanes	2	2
Width of Drive Lanes	10	12
Number of Turn Lanes/Median	0	0
Width of Turn Lanes/Median	N/A	N/A
Number of Parking Lanes	0	0
Width of Parking Lane	N/A	N/A
Number of Bike Lanes ¹	0 ¹	0
Width of Bike Lane	N/A	N/A
Number of Sidewalks ²	2 ²	1 ⁴
Width of Sidewalks	See Note 2	See Note 4
Number of Planter Strips	See Note 3	0 ⁵
Width of Planter Strip (incl. curb)	See detail in Appendix	N/A
Design Speed	25-30	35-40

Notes:

1. Two 4' shoulders and multi-modal trail on one side (see detail in the Appendix)
2. Includes 6' concrete sidewalk on one side, 10' multi-modal path on the other side
3. Includes drainage swale on each side and landscape strip on one side
4. Includes 10' multi-modal trail on one side (see detail in the Appendix)
5. Includes drainage swale on one side (see detail in the Appendix)

Table 2.03C – Alley Requirements

	Short Alley¹	Long Alley¹
Function and Limitations	Alleys provide direct access to adjoining lots. They reduce the number of required curb cuts along public streets and improve the appearance and human scale of streetscapes (i.e., by reducing the amount of parking and parking garages oriented to the street). Short alleys are appropriate in low-density residential zones with minimal traffic generation and relatively short blocks (i.e. 200-400 feet). Short alleys may function as through-travel lanes terminating at public streets or parking courts (e.g. hammer-head terminus) only. When used as parking courts, alleys may not exceed 150 feet in length. Alleys may not be used in a “grid” type pattern.	Long alleys are appropriate for low-density residential development on longer blocks (i.e. 400-500 feet), and medium and high-density residential development when parking bays are provided. They may also provide access to commercial development. Long alleys may function as through-travel lanes terminating at public streets or parking courts (e.g. hammer-head terminus) only. When used as parking courts for more than four vehicles, alleys may not exceed 150 feet in length (i.e. from street access to parking bay). Alleys may not be used in a “grid” type pattern.
Access	Full access to adjoining lots provided that all lots having alley access front on a public or private street and provided that alleys are a permanent secondary not primary means of access to the lot, unless otherwise authorized by the Planning Director, Public Works Director <u>City Engineer</u> , or hearings examiner.	Full access to adjoining lots provided that all lots having alley access front on a public or private street and provided that alleys are a permanent secondary not primary means of access to the lot, unless otherwise authorized by the Planning Director, Public Works Director <u>City Engineer</u> , or hearings examiner.
Average Daily Trips	Under 150+/-	Under 500+/-
A. Right-of-Way or Easement	12 feet minimum 15 feet maximum	20 feet minimum and maximum except as wider sections may be approved as necessary for parking courts.
B. Pavement Width	10 feet (1-foot clear zone on both sides)	18 feet (1-foot clear zone on both sides)
D. Building Setbacks and Clear Vision Zones	Please refer to zoning chapters.	Please refer to zoning chapters.
E. Lighting	Low-profile, security lighting shall be required with new development.	Low-profile, security lighting shall be required with new development.
1. The city engineer shall determine which alley standard is used. 2. Additional right-of-way or easement area may be required when parking bays are incorporated into the streetscape, or when slopes/physical conditions require additional right-of-way. Right-of-way requirements shall be determined through the subdivision and site design review permit process. 3. Alleys will be considered public streets to be owned and maintained by the City unless otherwise stated in the Conditions of Approval in the final land use approval or on the Final Plat. Must meet IFC Section 503 if determined by the Fire District to be a Fire Accessible Roads.		

2.04 Number of Lanes

The number of lanes for each class of road shall be as directed by the City Engineer. Additional lanes may be required at intersections in excess of the road sections shown in the Transportation Details.

Right-of-way may be needed in addition to that shown in the Transportation Details to accommodate the increased number of lanes at intersections.

2.05 Design Speed

Table 2.03A shows design speeds by functional classification. The design speed for arterials may be reduced due to unique topographic or traffic conditions if approved by the City Engineer. The design speed may also be temporarily reduced in construction zones, as determined by the City Engineer.

2.06 Dedications

- A. Right-of-Way shall be deeded for streets and other improvements as required to accommodate motorized and non-motorized transportation, landscaping, utility and buffer requirements. Conveyance shall be fee simple using a statutory warranty deed.
- B. Easements for all public systems shall be provided as required. Specific requirements for water and storm drainage easements are detailed in the relevant chapters. Particular design features of a road may necessitate slope, wall or drainage easements. Such easements may be required by the City Engineer in conjunction with dedication or acquisition of right-of-way and other standard easements (temporary construction, right of entry, sidewalk, pedestrian, street lighting, and traffic control devices, etc.).
- C. All subdivisions and short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the subdivision, where the existing right-of-way for a public street is not adequate to incorporate necessary frontage improvements for public safety and provide compatibility with area's circulation system and to meet the City's most recent Comprehensive Plan and Transportation Capital Facilities Plan.

All short subdivisions (short plats) will be required to deed additional right-of-way, as a condition of approval of the short plat, under one or more of the following conditions:

- 1.) The short plat abuts an existing substandard public street and the additional right-of-way is necessary to incorporate future frontage improvements necessary for public safety, or
- 2.) Additional right-of-way is needed to provide right-of-way for the extension of existing public street improvements necessary for public safety, or
- 3.) Additional right-of-way is needed to provide future street improvements necessary for public safety for planned new public streets.
- D. It is within the authority of the City Engineer to refuse to approve or sign any land partition, partition plat, or subdivision plat that the owner or developer has not obtained the necessary right-of-way and easements for the public infrastructure to serve the proposed and affected existing lots. Such approval may be withheld until it can be verified that the location and width of proposed rights of way and easements are adequate for the required infrastructure.
- E. Easements are subject to the approval of the City Attorney prior to recording. Variation from the City standard form of conveyance shall be allowed only when extraordinary circumstances warrant, as determined by the City Engineer and City Attorney.

F. Easement Widths

- 1.) Trail easements or tracts for system trails as identified in the City's Parks and Recreation Comprehensive Plan shall be dedicated to the City. Multi-Modal Trails require a 30-foot easement and Recreational Trails require a 20-foot easement.
- 2.) In residential subdivisions or residential short subdivisions, panhandle access (flag) driveway easement may be allowed for access to a maximum of two (2) lots and must have a minimum easement width of twenty (20) feet and shall not exceed 100 feet in length unless approved by the City Engineer. A greater width may be required to accommodate grading, utility requirements, or to comply with the International Fire Code.
- 3.) In commercial subdivisions or commercial short subdivisions, a private roadway easement or panhandle (flag) access easement may be allowed for access to a maximum of two (2) lots and must have a minimum easement width of thirty (30) feet. A greater width may be required to accommodate grading, utility requirements, or to comply with the International Fire Code.

- G.** All recording costs for easements created by private development shall be borne by the developer unless specifically agreed to by the City.

2.07 Private Streets

- A.** Criteria for Authorization. It is the City of Ridgefield's policy to discourage private streets and to only permit them under unusual circumstances as applied with small infill developments of a maximum of eight (8) lots. Private roads serving more than eight (8) lots qualify as private communities and must meet the requirements of Section 2.08 Private Communities. When allowed, private streets will only be permitted under the following conditions:
- 1.) Covenants have been approved, recorded, and verified with the City which provide for maintenance of the private streets and associated parking areas by owners in the development, and
 - 2.) Provision is made for the streets to be open at all times for emergency and public service vehicles, and
 - 3.) The private streets will not obstruct public street circulation, and
 - 4.) A private street shall ultimately serve a maximum of eight (8) residential or commercial lots. Any access serving three or more dwelling units shall be either a public or private street.
 - a) The private street has been approved by the Fire District
 - 5.) At least one of the following conditions exist:
 - a) The roadways serving commercial or industrial facilities where no circulation continuity is necessary.
- B.** The City Engineer determines that no other access is available and the private road is adequate. Notice. A statement is required on the face of any plat or short plat containing a private road that reads: "The City of Ridgefield has no responsibility to improve or maintain the private roads and it shall be the sole responsibility of the property owners to improve or maintain the private roads providing access to the property contained within and described in this plat". The developer or benefiting property owners shall submit a private road maintenance agreement for review by the City Engineer. The private road maintenance agreement shall be recorded with the plat.

C. Easements.

- 1.) The minimum easement for private roads serving 1-4 lots and less than 200 feet in length shall be twenty (20) feet.
- 2.) The minimum easement for private roads serving 5-8 lots, or greater than 200 feet in length shall be thirty (30) feet.

D. Design Requirements. Private streets shall conform to public street construction standards with the exceptions noted herein.

- 1.) Private streets shall be improved with a minimum road section matching City Standard Detail T-2.8. The minimum paved width shall be twenty (20) feet (curb face to curb face). Private roads serving more than 4 lots must include curb and gutter, and sidewalk on one side of the roadway (see E below).
- 2.) The maximum grade for private roadways shall be 18%. Roadways that must be used to provide access to fire vehicles, as determined by the Fire District, shall be a maximum of ten (10) percent, unless otherwise approved by the Fire District.
- 3.) Drainage improvement requirements shall be as specified in Chapter 3 of these Standards.
- 4.) Utility requirements shall be per this chapter, and Chapter 4 of these Standards.
- 5.) Provisions shall be made to allow trash collection for all lots served by the private road. For curbside service, adequate access shall be provided for collection trucks to safely access all lots, and all property owners shall sign a Damage Release Form as required by Waste Connections. If either of these conditions are not met, an appropriate location shall be provided nearby, accessed by a street meeting public standard, with adequate space for non-curbside service for all affected properties
- 6.) Street illumination is required at the intersection of a private street and a public street. No street lighting is required on private streets.

E. The City encourages the use of “Sustainable Street” concepts and also Low Impact Development (LID) concepts and techniques in proposed private street designs.

2.08 Private Communities

A. Criteria for Authorization. Private communities are allowed only as part of a Planned Unit Development. Where allowed, private communities must meet the following conditions:

- 1.) Covenants have been approved, recorded, and verified with the City which provide for maintenance of the private streets and associated parking areas by owners in the development, and Private communities may be gated, but the following conditions must be met:
 - a. Provision must be made for the streets to be open at all times to emergency and public service vehicles.
 - b. Stacking area. Each access point shall show an area of sufficient length and width to safely stack traffic coming onto the property from the adjacent roadway. The length of the stacking area shall be based on the adjacent roadway type, design configuration, and number of lots accessed through gates, but in no case shall be no less than 40-feet. A parking area shall be provided to the right of the entry lane to accommodate visitors not able to open the gate.
 - c. Entrance/Exit Design. Adequate vision clearance shall be provided so that motorists leaving a gated community have a clear view of the sidewalk on either side of the exit, and so that approaching pedestrians have a clear view of any approaching vehicle.

Gated community entrances and exits shall be designed to achieve travel speeds not to exceed 5 miles per hour, and shall require a vehicle stop directly prior to crossing the street sidewalk. Entrance and exit areas shall be designed so that vehicles approaching or leaving the gated community can queue to enter/exit the traffic stream without blocking the sidewalk.

- d. Turnaround feature. Each gate access point shall have an area that allows traffic to safely maneuver a turnaround when the gate is in closed position.
 - e. Gate Width. Fire and emergency access vehicles require passing room within the entrance to the development. Twenty feet of unobstructed driving surface is required on the interior side of the access point and gate.
 - f. No encroachment into publicly owned right-of-way. The gates, operating equipment and fencing shall be located wholly within the private portion of the property. The property line shall be clearly indicated on the site plan. Swing gates are not allowed to encroach into the public right-of-way. The drives, streets and lanes inside a gated community are to remain private.
 - g. Pedestrian Access. Separate pedestrian access from driving lanes. Each access point shall have a pedestrian access and walkway that is separate from the driving lanes and links directly to the public sidewalk. Pedestrian walkways shall meet all standards for accessibility required by the Americans with Disability Act and shall not be gated.
 - h. Lighting. Lighting fixtures consistent with Section 2.27 shall be provided for vehicle and pedestrian safety. Lights in private communities shall be metered and electricity costs will be the responsibility of the residents.
 - i. Sight Distance. Each access point shall demonstrate adequate sight distance as required by Section 2.16
 - j. Gate Material. The moving portion of the gate shall be constructed of material that is no more than 20% opaque. Typically, wrought iron or other decorative material is used.
 - k. Automatic gates shall have battery backup power. In the event of a power failure, the gates shall open and remain open until power is restored.
- 2.) The private streets within the private community will not obstruct public street circulation.
- 3.) The private streets and gate configuration shall be approved by the Fire District
- B. Notice.** A statement is required on the face of any plat or short plat containing a private road that reads: "The City of Ridgefield has no responsibility to improve or maintain the private roads and it shall be the sole responsibility of the property owners to improve or maintain the private roads providing access to the property contained within and described in this plat". The developer or benefiting property owners shall submit a private road maintenance agreement for review by the City Engineer. The private road maintenance agreement shall be recorded with the plat.
- C. Easements.** The minimum easement or tract width for a private road within a private community shall be forty-eight (48) feet.
- D. Design Requirements.** Private Streets within private communities shall conform to standards established for Local Residential streets.

2.09 Horizontal Alignment

Street alignments shall meet the following requirements:

- Center line alignment of improvements should be parallel to the center line of the right-of-way.
- Center line of a proposed street extension shall be aligned with the existing street center line.
- Horizontal curves in alignments shall meet the minimum radius requirements as shown in Table 2.09A or the low-speed curve table at the end of this section for residential local streets.
- Except on residential local streets, reversing horizontal curves shall be separated by no less than 50 feet of tangent. On arterials, the separation shall be no less than 100 feet.

Table 2.09A - Design Speed / Center Line Radius - Minimums

Arterials Streets and Commercial/Industrial Collectors		
Design Speed (mph)	Minimum Centerline Radius (ft)	
	Crown	(e) 6%
30	430'	273'
35	610'	380'
40	860'	509'
45	1,080'	656'

Collectors and Residential Streets				
Design Speed (mph)	Minimum Centerline Radius (ft)			
	Crown	(e) 2%	(e) 4%	(e) 6%
25	180'	155'	145'	135'
30	300'	250'	230'	215'
35	460'	375'	345'	320'

NOTES:

1. For Table 2.09A - off right-of-way runoff shall be controlled to prevent concentrated cross flow in super-elevated sections.
2. Super elevations may only be used with the written approval of the City Engineer. Where super elevation is used, street curves should be designed per AASHTO guidelines except that the maximum super elevation rate of 0.04 shall be used. If terrain dictates sharp curvature, a maximum super elevation of 0.06 is justified if the curve is long enough to provide an adequate super elevation transition.
3. On local streets, requests for design speeds less than 25 miles per hour shall be based on topography, right of way, or geographic conditions which impose an economic hardship on the applicant. Requests must show that a reduction in center line radius will not compromise safety. There will be posting requirements associated with designs below 25 miles per hour.
4. Off-set crown cross-sections are not acceptable as super elevation sections.
5. Super elevation transitions shall be designed to not allow concentrations of storm water to flow over the travel lanes.

Low speed curves may be used on residential local streets. Minimum centerline and curb radius for low speed curves shall be as follows:

	<u>Up to 75°</u>	<u>75° & Over</u>
A. Minimum Centerline Radius (2-lane)	100'	55'
B. Minimum Curb Radius	80'	35'

The intersection angle between the two roadways is to be as close to 90° (perpendicular) as practical.

2.10 Vertical Alignment

Street alignments shall meet the following requirements:

- A. Minimum tangent street gradients shall be one-half (0.5) percent along the crown and curb.
- B. Maximum street gradients shall be 15% for residential streets, and ten (10) percent for all other streets. Grades in excess of 15% must be approved in writing by the City Engineer on an individual basis.
- C. Local streets intersecting with a residential collector or greater functional classification street or streets intended to be posted with a stop sign shall provide a landing averaging five (5) percent or less. Landings are that portion of the street within twenty (20) feet of the projected curb line of the intersecting street at full improvement.
- D. Grade changes of more than one (1) percent shall be accomplished with vertical curves.
- E. At street intersections, the crown of the major (higher classification) street shall continue through the intersection. The roadway section of the minor street will flatten to match the longitudinal grade of the major street at the projected curb line.
- F. Street grades, intersections, and super elevation transitions shall be designed to not allow concentrations of storm water to flow across the travel lanes.
- G. Off-set crowns shall be allowed only with the specific prior approval of the City Engineer.
- H. Slope easements shall be dedicated or obtained for the purposes of grading outside of the right-of-way.
- I. Streets intersected by streets not constructed to full urban standards shall be designed to match both present and future (as far as practicable) vertical alignments of the intersecting street. The requirements of this manual shall be met for both present and future conditions.

When new streets are built adjacent to or crossing drainage ways, the following standards shall govern the vertical alignment:

Functional Classification	Vertical Standard
Arterial Streets	Travel lanes at or above the 50 year flood elevation but not lower than 6 inches below the 100 year flood elevation
All other streets	Travel lanes at or above the 25 year flood elevation but not lower than 6 inches below the 50 year flood elevation

Crest and sag vertical curves shall conform to the values found in Tables 2.10A and 2.10B. At controlled intersections, the K-value for crest vertical curves may be reduced, if approved by the City Engineer.

Table 2.10A
Design Controls for Crest Vertical Curves
Based on Stopping Sight Distance

Design Speed	Minimum k
25	12
30	19
35	29
40	44
45	61
50	84
55	114

Table 2.10B
Design Controls for Sag Vertical Curves
Based on Stopping Sight Distance

Design Speed	Minimum k
25	26
30	37
35	49
40	64
45	79
50	96
55	115

AASHTO provides the designer of sag vertical curves the option of using shorter curves with the installation of street lighting. These "comfort" designs can also be slightly modified by providing a one (1) percent grade break at each end of the curve. Table 2.10C compares sag curve lengths using these criteria.

**Table 2.10C – Design Controls for Lighted Sag Vertical Curves
25 Miles per Hour**

Algebraic Difference in Grades	Standard (k)	Comfort (k)	Comfort with Grade Breaks (k)
5.00%	26	13.4	8
7.50%	26	13.4	9.9
12.50%	26	13.4	11.3
17.50%	26	13.4	11.9

At the intersection of a local street with another local street or a minor collector street, a minimum design speed of 15 MPH is allowed on the intersecting street. Minimum k factors for lighted sag curves are shown in Table 2.10D.

**Table 2.10D – Design Controls for Lighted Sag Vertical Curves
15 Miles per Hour**

Algebraic Difference in Grades	Comfort (k)	Comfort with Grade Breaks (k)
5.00%	4.8	3
7.50%	4.8	3.6
12.50%	4.8	4.1
17.50%	4.9	4.3

2.11 Transitions

- A. Street width transitions from a narrower width to a wider width shall be designed with a 3 to 1 taper. Delineators, as approved by the City Engineer, shall be installed to define the configuration.
- B. For street width transitions from a wider width to a narrower width, the length of transition taper shall be determined as follows:

$$L = S \times W \text{ (for } S = 45 \text{ MPH or more)}$$

$$L = \frac{W \times S^2}{60} \text{ (for } S = \text{less than } 45)$$

Where L = minimum length of taper (feet)

S = Design speed (MPH)

W = EP to EP offset width

- C. Delineators, as approved by the City Engineer, may be installed to define the configuration. Maximum spacing of delineators shall be the numerical value of the design speed, in feet (i.e. 35- foot spacing for 35 MPH).
- D. In situations where a tapered transition cannot be provided, a barricade shall be installed at the end of the wider section of the street and a taper shall be appointed and delineated as approved by the City Engineer. The Type III barricade shall conform to WSDOT Standard

plans. If the wider section does not provide an additional travel lane, only a barricade is required without the transition.

2.12 Street Frontage Improvements

All residential subdivisions, commercial developments and short plats shall install street frontage improvements at the time of construction as detailed in their subdivision or short plat approval, as detailed in their approved engineering plans, or as directed by the City Engineer. Such improvements as determined by the City Engineer shall commence from the centerline of the right-of-way and is to include: sawcut and replacement of existing pavement and road section to the centerline of the traveled way or the centerline of right-of-way; curb and gutter; sidewalk; street storm drainage; street lighting system; traffic signal modification, relocation or installation; utility relocation and undergrounding; landscaping and irrigation and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington.

Any modification to the requirement for half-street improvements must be approved by the City Engineer before preliminary land use approval with the approved modification to be set forth in a "Condition of Approval" for the specific project.

If the existing pavement in the remaining half street opposite the project frontage is found to be in substandard condition as determined by a geotechnical engineer for the traffic generated by the project, and/or if any additional longitudinal utilities are to be installed with the frontage improvements within the existing paved width opposite the project frontage, an additional grind and overlay may also be required over the that half of the street for the extent of the frontage improvements as determined by the City Engineer.

- A. Plan Preparation shall be as specified in Chapter 1 of these Standards.
- B. Street Frontage design shall incorporate all applicable sections of these Standards and other standard reference materials. The designer shall utilize good engineering practice in any situation not specified in these Standards.

2.13 Street Ends

- A. All street lengths shall be measured from the face of curb of the intersecting street.
- B. Turnarounds shall be provided at all permanent public street ends. Turnarounds shall be provided at ends of private streets longer than one hundred fifty (150) feet.
- C. **Temporary Dead Ends.**

Where a street is temporarily dead ended, turnaround provisions must be provided where the road serves more than four lots or is longer than 150 feet in length. The turnaround may be a hammerhead as approved by the Fire District and the City Engineer if the dead end is less than one hundred and fifty (~~200-150~~) feet in length. If over ~~five hundred (500)~~ one hundred and fifty (150) feet long, a cul-de-sac is required. All temporary turnarounds shall be asphalt; gravel surfaces ~~will not be acceptable.~~ will be permitted if the street is expected to be extended within six months of the final construction acceptance date.

In the event a temporary turnaround is installed on a street that will be extended in the future, the party responsible for extending the road shall also be responsible for removing the temporary turnaround and installing all necessary curbing, sidewalk, landscaping, etc. within the removal area to meet current City standards.

D. Design Requirements.

The following specifies the minimum requirements for cul-de-sacs, eyebrows, and turnaround areas. Other turnaround geometrics may be used when conditions warrant and City Engineer approves the design and application of its use.

- 1.) Cul-de-sacs shall have a minimum outside curb radius forty-eight (48) feet for all streets.
- 2.) Cul-de-sacs, eyebrows, and turnaround areas shall be allowed only on local and commercial/industrial streets.
- 3.) Cul-de-sacs shall not be more than five-hundred (500) feet in length unless serving a topographically isolated area (such as a narrow ridge) as determined by the Community Development Director and City Engineer. The length of a cul-de-sac shall be measured along the center line of the roadway from the near side right-of-way of the nearest through traffic intersecting street to the farthest point of the cul-de-sac right-of-way.
- 4.) The minimum curb radius for transitions into cul-de-sac bulbs shall be twenty-eight (28) feet.
- 5.) The right-of-way radius for the cul-de-sac shall be sufficient to maintain the same right-of-way to curb spacing as in the adjacent portion of the road (i.e. a local residential street requires forty eight (48) foot curb radius with a fifty eight (58) foot right-of-way radius)
- 6.) Hammerheads are only permitted them under unusual circumstances as applied with small infill developments of a maximum of eight (8) lots. Hammerheads may be used in lieu of a cul-de-sac provided that the street serves Eight (8) or less lots and the street is less than two hundred (200) feet in length. Hammerhead geometry shall be approved by the Fire District and the City Engineer.
- 7.) An eyebrow corner may be used on a local street where expected ADT will not exceed 500 vehicles per day or as otherwise approved by the City Engineer. Minimum curb radius on the outside of an eyebrow corner is 36 feet; minimum right-of-way radius is 45 feet. Eyebrow geometry shall be evaluated on the basis of turning requirements for Fire Department vehicles.
- 8.) The turnaround shall be posted and painted "Fire Lane - No Parking".

2.14 Medians

- A. A median shall be in addition to, not part of, the specified roadway width unless shown on the standard street cross-sections. Medians shall be designed so as not to limit turning radius or sight distance at intersections. Landscaping and irrigation shall be installed when directed by the City Engineer.
- B. Where raised medians are allowed, the following criteria must be met:
 - 1.) Edges shall be vertical curb in urban areas, and either vertical curb or thickened edge in suburban areas.
 - 2.) Landscaping and irrigation are required. Plans shall be prepared by a qualified Landscape Architect.
 - 3.) Pedestrian refuges shall be provided where crosswalks intersect medians.
 - 4.) Pedestrian crossing flashing beacons shall be at the discretion of the City (Traffic) Engineer. When approved or required, the flashing beacon shall be:
 - Rectangular Rapid Flashing Beacon (RRFB);

- Internally Illuminated Flashing Beacon; or
 - Pedestrian Hybrid Beacon in high traffic, high speed situations.
For arterial roads, RRFB's shall be designed consistent with City of Vancouver standard plan T23-03¹. For collectors and below, Traffic Safety Supply Company's Pedestrian Crosswalk System Solar-Powered BlinkerSign® with Bulldog push buttons, or approved equal, shall be used. See Appendix C for details.
- 5.) Raised medians shall be designed so as not to limit turning radius or sight distance at intersections.
- The raised median shall be set back at least 1 foot from the median lane on both sides, unless otherwise approved by the City Engineer
 - Street lighting shall be sufficient to provide illumination of the raised median.
 - Objects, such as trees, shrubs, signs, and light poles shall not physically or visually interfere with traffic control devices, as well as vehicle or pedestrian traffic in the travel way.
 - The style and design of the raised median shall be site specific. The raised median shall be safe for the design speed, and shall be subject to City approval.

2.15 Intersections and Curb Returns

- A. Traffic control will be as specified in the MUTCD or as modified by the City Engineer as a result of appropriate traffic engineering studies.
- B. Traffic signal modification, relocation or installation is required when roadway or driveway geometrics interfere with existing signal facilities, or would result in an unsignalized approach or intersection that meets signal warrants.
- C. Angle between intersections. The interior angle at intersecting streets shall be kept as near to 90 degrees as possible and in no case shall it be less than 75 degrees. A tangent section shall be carried a minimum of 25 feet each side of intersecting right-of-way lines.
- D. Maximum street spacing - 500 feet.
- E. Minimum centerline offset of adjacent streets.
 - 1.) Residential - 160 feet
 - 2.) Residential or arterials intersecting arterials - 300 feet
- F. When determining the distance between a roundabout and another access, the measurement is not taken from the centerline. Instead, the point of reference is the outer edge of the inscribed circle diameter (Yield Line) on the nearest approach.
- G. Sloping approaches. On sloping approaches, including commercial driveways, garage entrances, and private street openings, landings are not to exceed two (2) feet difference in elevation for a distance of thirty (30) feet approaching an arterial or twenty (20) feet approaching a local collector or industrial or commercial street, measured from the back of sidewalk or the back of curb if no sidewalk exists.
- H. Curb returns. Curb radii at intersections shall be in accordance with Table 2.15A for the various functional classifications. The right-of-way radii at intersections shall be sufficient to include the entire sidewalk and ramp within the public right-of-way and shall have a minimum radii of 20-feet.

¹ <https://www.cityofvancouver.us/wp-content/uploads/2024/03/T23-03.pdf>

**Table 2.15A - Turning Radii (Feet)
Edge of Pavement/Curb -Minimums**

Street Classification	Major/Minor Arterial Street	Residential Collector Street	Commercial Industrial Street	Residential Access/Local Street
Major/Minor Arterial Street	55	30	40	25
Residential Collector Street	30	25	30	20
Commercial Industrial Street	40	30	40	25
Local Street	25	25	20	20

* If bike lane or on-street parking exists, above radii may be reduced by five (5) feet.

* The radii of the major street will be used for all intersection curb returns.

2.16 Sight Obstruction Requirements

- A. Sight distance should be maintained at all driveways, building or commercial garage entrances where structures, wing walls, etc. are located adjacent to or in close proximity to a pedestrian walkway.
- B. Sight lines to traffic control devices (signs, signals, etc.) should not be obscured by landscaping, street furniture, marquees, awnings or other obstructions. Refer to the MUTCD for required sightlines.
- C. Sight Distance. It is the policy of the City to have the developer's engineer evaluate safe intersection sight distance using the principles and methods recommended by AASHTO. Table 2.16A presents minimum intersection and commercial driveway sight distances.

Table 2.16A - Corner Sight Distance

Design Speed (MPH)	Minimum Corner Sight Distance (Feet)
20	225
30	335
40	445
50	555
60	665

The sight distances in table 2.16A assume a stopped passenger car turning left onto a two lane road with no median and grades of 3-percent or less. For other conditions the time gap must be adjusted and the sight distance recalculated. Intersection sight distance should always be measured from a driver's eye 3.5 feet high and 15 feet from the near edge of the nearest lane to an object height of 3.5 feet. Stopping sight distances must also be checked on the actual vertical and horizontal values of the proposed improvement. There shall be nothing to block observation of objects between the driver's eye height of 3.5 feet and an object height of 2.0 feet above grade in both directions. The only exceptions should be for luminaire or utility poles, conforming traffic control devices, and fire hydrants. Cumulative effects must be considered, and all efforts taken to minimize sight obstructions.

Modifications or exceptions to these standards shall be approved by the City Engineer.

2.17 Curb and Gutter - Types and Application

- A.** Vertical curb and gutter shall be utilized on all streets (residential, commercial or arterial) and on all islands and medians except when emergency vehicle access across the median is required.

Rolled Curb may be used at the end of cul-de-sacs where approved by the City Engineer.

- B.** The following specifies the requirements for curbs and cross-slope grading for streets:
- 1.) All streets shall include curbs on both sides, except in the situations of interim width improvements. Interim designs, where approved in writing by the City Engineer, shall have shoulders and ditches.
 - 2.) Interim width streets shall have 2-foot side shoulders adjacent to the street at a 2 percent cross-slope and roadside ditches each side of the shoulders with a maximum side-slope of 2 horizontal to 1 vertical. The 2-foot shoulder area may consist of a section of pavement and/or a section of crushed rock. The pavement section shall be a minimum of 2 feet wide and a maximum of 6 feet wide.
- C.** Grading outside the improved areas shall be as follows, unless approved in writing by the City Engineer:
- 1.) Arterials shall have a maximum 2 percent upward grading to the right-of-way line, and no steeper than 3 to 1 up, or 3 to 1 down, outside the right-of-way.
 - 2.) Local Street and Commercial/Industrial functional classifications shall have a maximum 2 percent upward grading to the right-of-way line, and no steeper than 3 to 1 up, or 3 to 1 down outside the public right-of-way.
 - 3.) Retaining walls shall be used if slopes are greater than the 3 to 1 requirement in the paragraphs above or where slope stability is a problem.
 - 4.) If slopes are to be maintained (mowed) by the City, a maximum of 4 to 1 slope will be required.

2.18 Survey Monuments

As a minimum standard for monumenting city right of ways, survey monuments shall be located at each street intersection, intersection points of the extension of the project perimeter boundary lines and the centerline of frontage streets; right of way PC, PT, bends and intersections with all property lines including the perimeter boundary lines of all subdivisions and short plats. Additional monumentation may be required by the City Engineer.

2.19 Concrete Sidewalks

Concrete sidewalks shall be provided on both sides of the street.

A. Exceptions

Sidewalks may be omitted under the following conditions if approved by the City Engineer:

- 1.) Where subdivision design provides an acceptable surfaced and maintained internal walkway system as approved by the City Engineer, a sidewalk may not be required adjacent to the street.

- 2.) Private roads serving more than four (4) lots require sidewalks on at least one side of the private road, as needed for connection to a pedestrian path or [Multi-Modal Trail](#).
- 3.) Alleys do not require sidewalks.
- 4.) Where roadways abut sensitive lands, the sidewalk may be omitted from one side of the street, provided that an alternative pedestrian route acceptable to the City Engineer is provided.

B. Width

- 1.) Required sidewalk widths for each street classification can be found in the Transportation Details.
- 2.) Width of sidewalk does not include curb.
- 3.) Meandering sidewalks shall maintain the full design width around obstructions that cannot be relocated. Additional Right-of-Way (or easement) may be required to either relocate the obstruction or meander the sidewalk.
- 4.) Sidewalk widening behind a mailbox or other obstruction shall be no less than five (5) feet long with a ten to one (10:1) taper to the standard sidewalk section.

C. Material

All sidewalks shall be four (4) inch thick Class 3,000 PSI concrete over 2 inches of crushed rock. At driveways the concrete shall be six (6) inches thick. A pervious paving material may be substituted if approved by the City Engineer.

D. Landscape/Separation

Where planter strips are required, the back of sidewalk should be placed 6-inches from the right-of-way line, unless approved by the City Engineer. Meandering sidewalks may be allowed where they provide an attractive planned alternative to straight sidewalks. A minimum three (3) foot separation between the back of the curb and sidewalk is required for landscaping and appurtenance locating purposes unless no practicable alternative exists and when approved in writing by the Engineer. Sidewalks shall meander no more than six (6) feet from the curb at all pedestrian crossings and at driveways.

E. Curb Ramps

- 1.) In accordance with State law, curb ramps meeting current Americans with Disabilities Act (ADA) requirements shall be provided at all pedestrian crossings with curb sections. The edge of the sidewalk shall merge into curb ramps. One ramp is used on each curb return on residential streets and unsignalized intersections. At signalized intersections, a curb ramp shall be aligned with each crosswalk.
- 2.) All curb ramps at curb returns and ramps tying into public facilities shall be specifically designed by the developer's engineer. Design shall include an individual detail with elevations shown at all angle points and grade breaks within the ramp so as to indicate to the contractor how the ramp is to be installed to ADA requirements.

F. Defective Sidewalk

- 1.) All sidewalks shall be maintained in a level, nonhazardous condition. Sidewalks shall be deemed to be "defective" and require repair when deficiencies are identified which include:
 - a. Improper placement
 - b. Placement of sidewalk on unstable areas of uncompacted soil
 - c. Tree roots popping up sidewalk leading to jagged and uneven surfaces exceeding ADA allowances
 - d. Wear and tear having led to cracks and holes in the sidewalk

Responsibilities for maintaining sidewalk in good condition is under Ridgefield Municipal Code 12.04.080 - Responsibility of abutting property owner—Liability for damages. All construction, repair, upkeep, reconstruction and maintenance of sidewalks and curbs within the city limits, unless specifically excepted in Section C of this chapter, is the responsibility of the abutting property owner.

2.20 Asphalt Sidewalks

- A. Asphalt sidewalks may be allowed in lieu of concrete sidewalks where the sidewalk as determined by the City Engineer is deemed to be of a temporary nature (such as during construction activities) or due to future construction considerations.

2.21 Trails

- A. Trails standards are defined in Volume 3 - Parks, Trails and Recreation Design and Construction Requirements.

~~A. Multi-Use Trails~~

- ~~1.) Trail widths shall be as follows:
 - a. Type 1 trail 10-12 feet
 - b. Type 2 trail 8-10 feet
 - c. Type 3 trail 6-8 feet~~
- ~~2.) Materials shall be per the requirements of Section 2.33 Surfacing Requirements.~~
- ~~3.) Multi-use trails shall be a minimum of four (4) feet from the edge of the vehicular travel way unless no practicable alternative exists and when approved by the Engineer.~~
- ~~4.) Maximum grade is 15%. Type II barricade shall be installed at the end of trail sections as directed by the City Engineer.~~
- ~~5.) Trails may be used as a substitute for concrete sidewalks or bike lanes in planned unit developments where the City Engineer deems that non-motorized transportation goals of the City are being met.~~

~~B. Off-Road Trails~~

- ~~1. All City Trail Systems are to meet the multi-use standards above as reasonably possible. For Trail Systems that cannot meet the multi-use standards above, as determined by the City Engineer, the minimum standards for the design and construction shall generally follow as a practical guide for trail work the 2007 Edition of the "Trail Construction and Maintenance Notebook" and the 2007 Edition of the~~

~~“Wetland Trail Design and Construction”, Forest Service Publication List Document Numbers 0723-2806-MTDC and 0123-2833-MTDC respectively. These practical guides can be located on the Federal Highway Administration (FHWA) website at http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/index.cfm.~~

2.22 Bikeways/Bike Lanes

- A. Bikeway construction is required in conjunction with commercial development, plat or short plat approval, when the need for such a bikeway is established by the Community Development Director.
- B. Separated bikeways (bicycles only) shall be a minimum of five (5) feet wide for one way and ten (10) feet wide for two (2) way flow. Separated bikeways combined with pedestrian facilities shall be a minimum of ten (10) feet wide.
- C. Where joint vehicular and bicycle facilities (Bike lanes) are constructed, the curb lane shall be fourteen (14) feet wide and use eighteen (18) inch wide Type A curb and gutter.
- D. Surfacing requirements for separated bikeways shall be as specified in Section 2.33.
- E. Maximum grade for separated bikeways shall be ten percent (10%). Minimum curve radius is 100 feet. Curves should be minimized.
- F. Bump outs. A "bump out" at street intersections per Standard Drawings shall be installed on all routes with bike lanes using the following criteria:
 - 1.) Two-lane roadway - not applicable.
 - 2.) Three-lane roadway - "bump out" at all signalized intersections only.
 - 3.) Four- to five-lane roadway - "bump out" at all signalized intersections and at major side street intersections where the right turn volume onto the minor street exceeds 600 ADT.

2.23 Driveways

A. General Requirements

- 1.) Standard residential or commercial driveways shall be required for all developments.
- 2.) In new residential subdivisions or residential short subdivisions, panhandle and flag lot driveways shall be less than 150 feet and have a minimum paved access driveway of twelve (12) feet in width and shall provide access to no more than two (2) lots. The private or public road standards shall be used for access to more than two (2) lots.
- 3.) Only one driveway access per residential lot shall be allowed unless approved by the City Engineer.
- 4.) A private intersection opening shall be used in lieu of a conventional driveway in commercial areas where the following criteria or as determined by the City Engineer are met:
 - Projected driveway usage is greater than two-thousand (2,000) vehicles per day.
 - In any case where traffic signalization is approved and provided.
 - A minimum 100 foot storage area is provided between the street and any turning or parking maneuvers within the development.
 - The opening is at least 150 feet from any other intersection opening.

- The opening is at least 150 feet away from any other driveway on the property frontage under control of the applicant.

B. Conditions of Approval

- 1.) Driveways directly giving access onto arterials may be denied if alternate access is available. Driveways giving access onto other roadways may be denied, if in the opinion of the City Engineer, they create a potentially unsafe or hazardous condition.
- 2.) All abandoned driveway areas on the street frontage to be improved shall be removed and new curb, gutter, and sidewalk shall be installed.
- 3.) No commercial driveway shall be approved where backing onto the sidewalk or street will occur.
- 4.) Left turns from and to a driveway may be restricted as a development condition or in the future if such maneuvers are found by the City Engineer to be unduly hazardous.
- 5.) Driveways shall be aligned wherever possible with existing driveways on the opposite side of the street.
- 6.) If driveways cannot be aligned directly across from a driveway on the opposite side of the street, they shall be offset a minimum of 100 feet from driveways on the opposite side of the street whenever possible.
- 7.) All driveways shall be angled ninety-degrees (90°) to the street, unless designated as right turn only with the approval of the City Engineer.
- 8.) Driveways approved by the City Engineer providing for access onto collectors shall be a minimum of 100 feet from any intersection, and a minimum of 150 feet for access onto arterials. All distances shall be measured from the centerline of the street or driveway.
- 9.) Driveway modification requests will be reviewed under the Design Modification Process in Section 1.17 except for the following, which can be reviewed through a written request to the ~~Public Works Director~~ City Engineer or designee, prior to construction:
 - a. Where two or more parcels or tax lots have been previously combined into a single lot.
 - b. Requests for circular driveways (one way in and out) where lot configuration, topography or other site conditions affect the ability to build one driveway.
 - c. All requests for driveway modifications in residential zoning will be reviewed for conformance to applicable Codes, Covenants and Restrictions (CC&R) for the residential location.

C. Design Criteria

- 1.) Width.
 - a. For certain residential uses, driveway widths are limited. These are referenced in RMC 18.206.020 – Single-family design standards, 18.206.050 – Duplex and triplex, and 18.206.060 – Townhouse.
 - b. Where not limited in Subsection (a) above, for all other residential uses, the maximum driveway width shall be 30 feet or 50% of the lot frontage, whichever is less. For

residential uses the maximum driveway width shall be 30 feet or 50% of the lot frontage, whichever is less.

- c. For commercial uses, the maximum driveway width shall be 30 feet. A wider commercial driveway width may be approved by the City Engineer where a substantial percentage of oversized vehicle traffic exists and where it can be justified via modeling or some other approved means. In this case the driveway should be sized to accommodate the largest vehicles, but shall be no wider than fifty (50) feet. Where intersection openings are approved, the width shall be as determined by the City Engineer.
 - d. Driveways on residential or local access streets serving detached single-family homes may be up to 32 feet in width, subject to approval by the City Engineer.
 - e. Driveways on local access streets serving detached single-family homes may be up to thirty (32) feet in width, subject to approval by the City Engineer. There shall be adequate top of curb space provided between detached single-family driveway aprons at the property line for location of water meters, landscaping, and street lighting.
- 2.) Elevation. For new development, driveways on local access streets serving single family homes adjacent to detached sidewalk (i.e. standard detail sheets T-2.8 and T-2.9) shall match the same elevation as the front of the walk adjacent to the driveway approach. Any variation to this requirement is to follow city standards as approved by the City Engineer.
- 3.) Clearance from structures. No object (including fire hydrants, light or power poles, street trees) shall be placed or allowed to remain within 15 feet of the driveway edge.
- Where the building facade or other design element is less than ten (10) feet behind the sidewalk front setback both pedestrian and vehicular sight distance shall be maintained. Vehicular sight distance shall be per Section 2.15.
- 4.) Sight Distance. Pedestrian sight distance shall be as follows: The driver of an exiting vehicle shall be able to view a one (1) foot high object fifteen (15) feet away from either edge of the driveway throat when the driver's eye is fourteen (14) feet behind the back of the sidewalk.
- 5.) Maximum driveway grade shall be 15%.
- 6.) On sloping approaches, a landing as described in Section 2.09, shall be provided.
- 7.) Approach grades and configuration shall accommodate future street widening to prevent major driveway reconstruction.

2.24 Bridges

- A. Design Principles. All bridges, whether on public or private roadways, shall meet the minimum requirements set forth in the latest addition of "Standard Specifications for Highway Bridges", adopted by AASHTO. All new bridges shall be designed to carry an AASHTO HS-20-44 live load or greater.
- B. Geometrics. In the general case, the bridge shall comprise the full width and configuration of the road being served (traveled way plus curb, sidewalk, walkway, bike lane, and/or shoulder on one or both sides). Requirements of utilities shall be considered. Traffic and pedestrian railings or combination traffic-pedestrian railings shall meet AASHTO specifications. Overhead vertical clearances on the traveled street or under overpasses shall be sixteen and one-half (16.5) feet minimum.

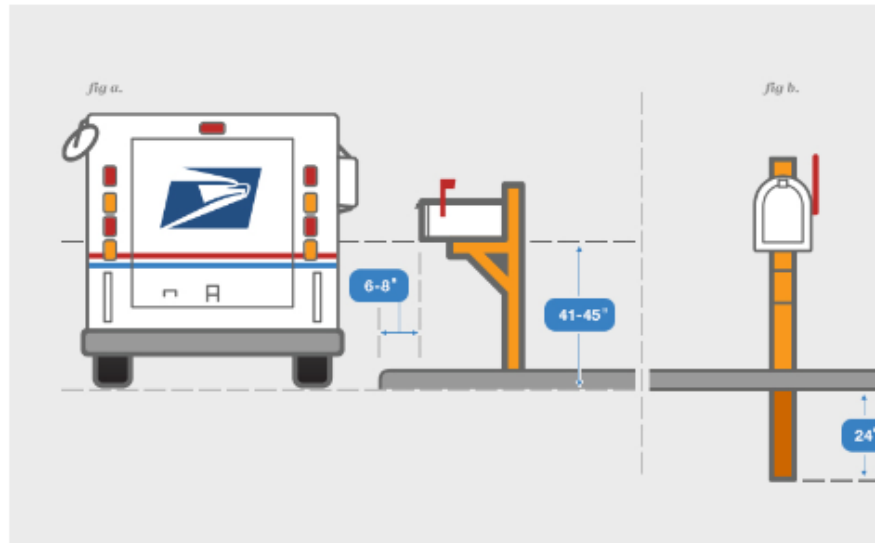
2.25 Landscaping in the Right-Of-Way, Easements and Access Tracts

- A.** Plantings established in the right-of-way shall be maintained by the abutting property owner on local and access streets. Plantings established in the right-of-way along collector and arterial streets shall be maintained by the Home Owner's Association / Business Association.
- B.** Any existing planting areas within the right-of-way that are disturbed by construction activity shall be restored to their original condition.
- C.** Any plantings or other improvements placed within the right-of-way (by abutting property owners) are subject to removal when the right-of-way is needed for public use. The property owner is responsible for removing any landscaping or other improvements upon official notice. The property owners shall be responsible for survival of the relocated plantings.
- D.** Measures shall be taken by the developer to provide groundcover in areas within the right-of-way which have been stripped of natural vegetation or have a potential for erosion. Native plants shall be used whenever possible.
- E.** Plantings within the right-of-way shall comply with the following provisions:
 - 1.) All landscaping shall comply with the sight distance provisions of these standards.
 - 2.) Where existing landscaping maintained by the City exists every effort shall be taken to protect and preserve the existing vegetation during construction. Plants shall be relocated or removed only upon approval of the Public Works Department. Damaged landscape areas shall be restored prior to issuing a final occupancy permit.
 - 3.) In areas where an existing landscaping concept or pattern has been established or approved, all new landscaping shall conform to the intent of the concept. Plantings shall be of a similar variety, size, and spacing to those already established and/or approved for the area.
 - 4.) All trees planted in areas with adjacent pedestrian usage shall maintain a seven (7) foot clearance to the lowest branches.
 - 5.) Approval from the Public Works Department must be received before trees are planted in or adjacent to sidewalk sections.
 - 6.) Landscaping in public right of way with low maintenance, drought tolerant ground cover is encouraged. Native plant lists and list of nuisance and prohibited plants are included in RMC Section 18.830.
- F.** Street trees shall be selected from the City's approved tree list (see Volume I - Appendix A: City of Ridgefield Street Tree Selection).
- G.** Street trees shall provide a minimum of 10-ft of separation from water meters. This standard shall also apply to onsite improvements.
- H.** Street trees shall have root barriers installed where adjacent to pavement (i.e. curbs, sidewalk, etc.).
- I.** Street trees shall not obstruct visibility of intersections, signs, or other critical roadside elements. The following are minimum clearances that shall be met:
 - 1.) 20-ft from the front of stop and street name signs.
 - 2.) 20-ft from the front and 5-ft from the back of other directional, traffic control or safety signs, such as yield, pedestrian crossing, school, speed limit, etc.

- 3.) 15-ft from street lights for narrow-growing tree species. Otherwise, 25-ft from street lights.
- 4.) 25-ft from traffic signals.

2.26 Mailboxes

- A. Mailboxes should be clustered together when practical and when reasonably convenient to the houses served. Community mailboxes are required in new developments and require approval by the Ridgefield Postmaster.
- B. When mailboxes are located in the sidewalk, individually or in clusters, sidewalk shall be widened to provide the full design width around the mailboxes.
- C. In the case of new road construction, or reconstruction requiring mailboxes to be moved back or rearranged, the designer and builder shall coordinate with the Ridgefield postmaster of the U.S. Postal Service. Mailbox locations approved by the Post Office shall be shown on approved road construction plans.
- D. Requests for new mailboxes in the downtown area shall be submitted to the Ridgefield Postmaster for approval. The City will review these requests to ensure they do not block sidewalks, and if there is a sidewalk present, they can surface mount the mailbox (i.e. attach it to the concrete surface and would not need to dig through the sidewalk), and the mailbox unit when installed will leave at least 48" behind the mailbox for ADA/wheelchair passage. A template from the USPS is located below. Those installing mailboxes which involve in-ground installation shall call the utility locator service 811 before they dig to avoid damaging underground utilities. Mailbox requests along Pioneer Street between 5th and Main Avenue, and Main Avenue between Pioneer Street and Mill Street, will not be accepted unless the request is for compliance with accessibility requirements under the Americans with Disabilities Act, or if no other location options are feasible.



2.27 Street Illumination

A. Plats and Short Plats

Street lighting is required for all public streets and private communities. The street lighting design shall be reviewed and approved by the City Engineer prior to final plat approval. The cost of all street lighting shall be paid for by the developer.

The City will accept maintenance and power cost responsibility for the public street light system only. Until the public improvements have been fully accepted by the City, the developer is responsible for the maintenance and energy charges for the street lighting system.

Street lighting is not required on private streets within a plat. However, a street lighting system is encouraged. The City does not install or maintain private street lighting systems. On private streets, all street light maintenance and power cost shall be paid by the developer, homeowner, or homeowners association.

B. Existing Residential Areas

If a resident or group of residents desires the installation of a new street light they must apply to the ~~Public Works Director~~ City Engineer or designee.

C. Commercial

Street lighting is required on all public street frontages. The developer is responsible for design, installation or relocation of new or existing lighting. Commercial development shall replace existing lighting systems on power poles with a new lighting system serviced by underground power.

D. General Considerations

All public street light designs shall be prepared by a licensed engineer experienced in lighting design. The design plans and calculations should indicate luminaire type, luminaire spacing, illumination levels, uniformity ratio, line losses and the electrical and physical layout of the system, including its connection to the existing system and foundation design.

Street lights shall meet requirements of Municipal Code Section 18.715.050 for alignment and shielding requirements. Street lights are intended to be “night sky friendly”. In addition to code requirements, lights shall be provided with a cap to minimize stray light going up. All public street light systems shall be accessible for public maintenance by a wheeled vehicle weighing twenty thousand pounds (20,000 lbs.).

All street light installations including wiring, conduit, and power connections shall be located underground. Exception: existing residential areas with existing above ground utilities may have street lighting installed on the existing power poles as approved by the ~~Public Works Director~~ City Engineer or designee as noted above.

All street lights shall be on one hundred twenty (120v) volt single phase systems. The exact location of the power source should be indicated together with the remaining capacity of that circuit. System continuity and extension should be considered.

Contractor cabinets equipped with electrical meters, time clocks, circuit breakers and other required components are required on commercial installations of five (5) or more street lights.

Particular attention shall be given to locating luminaires near intersections, at all street ends and at pedestrian and/or equestrian crossings.

E. Illumination

The lighting engineer shall use the standard specifications of the Washington State Department of Transportation for Pioneer Street, and for all other City streets shall use the following requirements:

Table 2.27A - Illumination Levels

Street Classification	Horizontal Foot Candles	Uniformity Ratio (average to minimum)
Principal Arterials	1.2 FC	3:1
Roundabouts**	1.2 FC*	3:1
Minor and Collector Arterials	0.8 FC	3:1
Local Commercial/Industrial	0.8 FC	3:1
Residential Access	0.4 FC	3:1
Local Residential Streets***	0.3 FC	4:1

* On lower pedestrian activity intersections, 0.9 FC shall be used. Coordinate with City Engineer for confirmation of designation.

** Roundabouts shall follow WSDOT Design Manual standards for analysis zones per Chapter 1040.

*** Cul-de-sacs may be permitted to have reduced lighting resulting in a Uniformity Ratio (average to minimum) of up to 6:1.

F. Approved Street Lighting Fixtures and Poles

All lighting projects within the City of Ridgefield and the City of Ridgefield Urban Growth Area shall use the products listed below or an approved equal. Contact the City Engineer to request approval for products not listed below (approved equal) or for a list of approved equals. Part numbers listed for fixtures and poles are based on current catalogs, which are subject to change by manufacturers at any time. The developer shall be responsible to verify part numbers with the appropriate vendors to ensure the correct lighting, poles, colors, and mounting hardware are received. Street light requirements including type, wattage, and pole height will be established by City of Ridgefield staff.

All lighting to meet current version of ANSI C136.15 for Field Wattage Identification and must have a label attached from an OSHA accredited Nationally Recognized Testing Lab. All light fixtures shall be warrantied for 5 years from the date of installation. All light poles shall be warrantied for 1 year from the date of installation.

1.) Local Streets – Standard Light Fixtures and Poles

For local streets, including new subdivisions and short plats, all streetlights shall be decorative acorn single fixtures on cast aluminum decorative poles. The luminaire shall be LED in 3000K with minimum output of 5000 lumens. Optic shall meet Municipal Code requirements. Fixture shall be DLC listed.

The light fixtures shall be the following or approved equivalent:

Name: Holophane AWDE3 Acrylic Washington Postilite Utility LED3
Performance Package: 5,884 Lumens, 40 Watts, 147 LPW
Catalog Code: AWDE3 P20 30K MVOLT MS AL3 BK FBM CR TGL PR7 AO PCLL
Holophane Custom Vendor Code for City of Ridgefield: RFD339387
Description: Acrylic Washington Postilite Utility LED3 Fixture, P20 Performance Package, 3000K CCT, Auto-Sensing 120-277V 50/60HZ, Modern Style Swing Open Design, Acrylic Type III, Black Housing, Full Cover with Medallions and Band, Cross Finial, Dimming Photocontrol Receptacle - 7 PIN, Field Adjustable Output, Long Life DTL Twistlock Photocontrol for Solid State, MVOLT. Custom Vertical Slotted Band and Cross Finial Painted Gold, Medallions and Full Cover Painted Black.

The light poles shall be the following or approved equivalent:

Name: Holophane WDA Wadsworth Aluminum Pole

Catalog Code: WDA 14 F4C 17D C03 BK AB-31-4

Description: WDA Wadsworth Aluminum Pole, 14 Feet Height, 4" Diameter Fluted, .125 Wall, 17" Base, Diamon Pattern Bolt Circle, 3X3 Tenon, Black Finish, 3/4" Anchor Bolt Set Galvanized Steel.

Pole foundations shall be [per WSDOT Standard Plan J-21.10.05, or shall be](#) designed by a licensed engineer for site specific conditions and shall be adequate to accommodate all loads and anchorage means specified by the pole manufacturer.

2.) **Standard Light Fixtures – Roundabouts, Collectors and Arterials**

For roundabouts, collectors and arterials, all streetlights shall be cobra head fixtures on aluminum poles. The luminaire shall be LED 4000K with a minimum output of 9450 lumens. Fixture shall be DLC listed.

The light fixtures shall be the following or approved equivalent:

Name: American Electric Lighting Autobahn Series ATB0 Roadway Lighting

Performance Package: 10,260 Lumens, 70 Watts, 148 LPW

Catalog Code: ATB0 P203 MVOLT R3 BK NL P7 AO PCLL

Description: Autobahn LED Roadway Series Fixture, P203 Performance Package, Multi-volt 120V-277V, Roadway Type III Optics, 4000K CCT, Black Paint, Nema Label, 7 Pin Photocontrol Receptacle, Field Adjustable Output, Solid State Long Life Photocontrol.

The light poles shall be the following or approved equivalent:

Name: HAPCO Arlen Style Special 34' Light Pole

Catalog Code: HAPCO Customer Vendor Code for the City of Ridgefield: B86264-P1

Description: B86264-P1 Custom Light Pole for the City of Ridgefield with textured black finish, 20" diameter base with 22" base height. ASTM F1554 Grade 55 x 42" length all thread rod anchor bolts.

Pole foundations shall be [per City Standard Detail T-2.12, or shall be](#) designed by a licensed engineer for site specific conditions and shall be adequate to accommodate all loads and anchorage means specified by the pole manufacturer.

2.28 Traffic Control and Signing

- A. Traffic Control Devices. The City Engineer shall review and approve all traffic control devices.
- B. Signing. In new plats the developer shall install all traffic control signs which shall include but not be limited to street name, parking, stop, dead end, and pedestrian signing. The developer will be responsible for supplying and installing the required signs.
- C. Pavement Marking. In new plats or commercial developments pavement markings, including buttons, paint, thermoplastics and delineators will be required for roadway safety. Such markings shall be provided and installed by the developer. All markings shall be approved by the City Engineer prior to installation.
- D. Temporary Traffic Control. It is the responsibility of the developer to provide adequate temporary traffic control to ensure traffic safety during construction activities.
- E. Traffic Signal Modification. Traffic signal modification designs shall be prepared by a licensed engineer experienced in traffic signal design.
- F. Design Requirements

- 1.) Traffic Control Devices. All traffic control devices shall conform to the Manual on Uniform Traffic Control Devices (M.U.T.C.D.) as adopted by the Washington State Department of Transportation (WSDOT).
- 2.) Signing. Sign sizes shall conform M.U.T.C.D standards. Sign installations shall be per City Standard Detail T-3.1A and T-3.1B.

- i. No parking signs shall follow M.U.T.C.D. R7-1 or R7-2 templates unless otherwise approved by the City Engineer. Fire lane signs shall follow the same font and sizing guidelines.
- ii. Street name signs shall be green with a white border and white text. Street name signs for private roads shall be white with green text. See City Standard detail T-3.1C for sign dimensioning and additional requirements.
- iii. Street name signs shall use the following road type abbreviations where applicable.

<u>Type</u>	<u>Abbreviation</u>
<u>Avenue</u>	<u>Ave</u>
<u>Boulevard</u>	<u>Blvd</u>
<u>Circle</u>	<u>Cir</u>
<u>Court</u>	<u>Ct</u>
<u>Drive</u>	<u>Dr</u>
<u>Lane</u>	<u>Ln</u>
<u>Loop</u>	<u>Lp</u>
<u>Parkway</u>	<u>Pkwy</u>
<u>Place</u>	<u>Pl</u>
<u>Road</u>	<u>Rd</u>
<u>Street</u>	<u>St</u>
<u>Terrace</u>	<u>Ter</u>
<u>Way</u>	<u>Way</u>

- 3.) Pavement Marking. All markings shall conform to the current M.U.T.C.D. as adopted by WSDOT.

- 4.) Temporary Traffic Control. All traffic control devices shall conform to the current M.U.T.C.D. as adopted by WSDOT or as modified by the City Engineer.
- 5.) Speed Humps. Speed humps shall be per City Standard Detail T-3.2.
- 6.) Traffic Signal Modification. The developer's engineer shall use the standard specifications developed by the City Engineer in conjunction with the current edition of WSDOT's Standard Plans and Specifications for Road, Bridge, and Municipal Construction.
- 7.) Enhanced Pedestrian Crossings: the City Engineer shall assess and determine if certain enhanced pedestrian crossings are required and develop a set of guidelines for consideration of such devices. Enhancements include a High Intensity Actuated Crossing ("HAWK") signal, a Rectangular Rapid Flashing Beacon ("RRFB") and Internally Illuminated Actuated Flashing Sign.

2.29 Clear Zone and Appurtenances

An appurtenance shall be considered to be any fixed object located adjacent to the roadway and deemed to be a possible safety hazard.

- A. All non-breakaway appurtenances shall be located a minimum of three (3) feet behind the face of the curb to the face of the object. Where no curb exists the distance from the edge of the travel way to the face of the object shall be at least six (6) feet.
- B. All breakaway objects shall be located a minimum of two (2) feet behind the face of curb to the face of the object. All objects having properties up to that of a 4" x 4" wooden post shall be considered breakaway.
- C. Appurtenances shall be located outside of the sidewalk area except when the sidewalk is widened around the appurtenance to the satisfaction of the City Engineer.

2.30 Franchise Utilities

- A. Non-City owned franchise utilities are required to relocate existing facilities at their own expense when a conflict results between their facilities and public street improvements. For development related work, the proposed improvements must be required by the non-City owned utility in order for the relocation work to be the financial responsibility of the utility, otherwise all costs shall be the responsibility of the developer.
- B. All non-City owned utility distribution or collection systems, franchise or otherwise, including power, telephone, and television cable in new plats or short plats and along roadway frontage improvements shall be underground.
- C. As a minimum on all new single family plats and short plats, a minimum five (5) foot wide common or individual non-exclusive utility easement shall be provided connecting any lots without public street frontage to a public street. Easements for existing or future utility lines which do not lie along rear or side lot lines shall be of a width specified by the serving utility.

2.31 Safety Railing

- A. Where a sidewalk or other non-motorized transportation facility is to be constructed above a slope or adjacent to a wall where the lowest finished elevation of the slope or wall is to be thirty (30) inches or more below the finished elevation of the sidewalk or other facility, a safety railing shall be required when:
 - 1.) The plane of a wall face is less than four (4) feet in horizontal distance from the near side face of the sidewalk or other facility.

- 2.) The plane of the wall face is greater than four (4) feet horizontal distance to the near side face of the sidewalk or other facility but the slope down to the wall top exceeds three to one (3H:1V).
 - 3.) The slopes adjacent to the sidewalk or other facility average greater than two to one (2H:1V).
- B. Safety railings or other approved devices (such as walls, high curbs, landscape features or guard rails) shall be required where grading operations will produce a parking area, service yard or other vehicle area which has a drop-off grade separation in relation to adjoining properties or streets.
 - C. Safety railings shall be constructed of 2-inch galvanized steel pipe or aluminum with vertical supports ten (10) feet on center and 3 horizontal railings fourteen (14) inches on center, the lowest railing center being fourteen (14) inches above finished grade. All joints shall be welded, cold galvanized if welded after galvanizing, and the entire safety railing painted or vinyl coated to assure corrosion protection and a pleasing appearance at the City's option. Railings shall be erected and adjusted, if necessary, after initially set to assure a continuous line and grade. Warning signs stating "Danger, Please Keep Off" shall be attached to the railing spaced every 50 feet or as directed by the City Engineer.
 - D. Safety rails shall be placed in sidewalk adjacent to bioretention facilities located within the public right-of-way. Project abuts existing bioretention facilities, safety rails shall be retrofit installed. See City installation detail ST-13.0.

2.32 Guard Rails

For purposes of warrants, design, and location, all guard rails along roadways shall conform to the criteria of the "Washington State Department of Transportation Design Manual" as may be amended or revised. The decision of whether to install a guardrail or not shall be based on information found in AASHTO publication, Guide for Selecting, Locating, and Designing Traffic Barriers.

2.33 Surfacing Requirements

All materials and workmanship shall be in accordance with the Standard Specifications, these Standards, and as approved by the Engineer.

A. Minimum Structural Section.

Minimum section requirements for surfacing of specific facilities are included in the City Standard Details. The following are the *minimum* requirements for surfacing for specific facilities covered in the Standard Details.

Facility		Surfacing Requirements
1.	Concrete Sidewalks	4" Portland Cement Concrete over 2" of crushed surfacing top course rock

All minimum surfacing requirements assume an acceptable, well drained, stable, compacted subgrade. Additional requirements may be imposed at the discretion of the City Engineer if suitable subgrade conditions are not met. A pervious material may be used for trails and sidewalks with approval of the City Engineer.

B. Alternative Sections

Streets may be constructed of any of the following:

- 1.) Asphaltic concrete with crushed rock base or treated base.
 - a. Cement treated bases and subgrades, where proposed, shall be designed and approved by the City prior to Final Engineering plan approval.
 1. Design shall have geotechnical investigation performed to obtain samples and determine cement percentage required to obtain 3,000 psi 30-day compressive strength, in addition to optimal moisture content.
- 2.) Full depth asphaltic concrete.
- 3.) Portland cement concrete with cushion course of crushed rock or on a base of crushed rock or treated base.

For pavement sections, other than those in Section 2.33.A, alternative sections may be approved by the City Engineer following submission of calculations by a registered engineer and per the design requirements described herein. Soil testing to obtain the strength of the soil is required for all roads and streets in order to analyze and design the structural section. Soil tests are needed on undisturbed samples of the subgrade materials that are expected to be within three (3) feet of the planned subgrade elevation. Samples are needed for each five hundred (500) feet of roadway and for each visually observed soil type. Soil tests are required from a minimum of three (3) locations.

The selected design structural strength of the soil shall be consistent with the subgrade compaction requirements. The strength and compaction moisture content, at optimum to slightly over optimum, shall be specified. The soils report shall address subgrade drainage and ground water considerations for year-round conditions.

The required density of treated and untreated subgrade materials shall not be less than 95% maximum density as determined by AASHTO T-99.

C. Aggregate Base

All aggregate shall meet WSDOT specifications for base rock.

During compaction, materials shall be maintained within two (2) percent of the optimum moisture content. The contractor shall begin compaction of each layer immediately after the material is spread and continue until a density of not less than 95% of the maximum density has been achieved. Maximum density will be determined by AASHTO T-180, or WSDOT Test Method 705.

D. Asphalt Pavement Design

The base course and wearing course of asphalt concrete (AC) for streets shall be WSDOT "Superpave" Hot Mix Asphalt (HMA) Class 1/2-inch, PG 58H-22, except for arterial facilities where HMA Class 1/2-inch, PG 58V-22 will be required.

The compaction shall be at least 92% based on a Rice theoretical maximum density, as determined in conformance with AASHTO T 209, as modified by WSDOT. In addition, for each mix used, a 50 blow Marshall (AASHTO T 245) shall be performed and all related test data shall be provided to the City Engineer. The minimum stability shall be 1,800 pounds, the flow shall be between 8.0 and 16.0 hundredths of an inch, and the voids shall be between three (3) and five (5) percent. The Marshall requirement may be waived by the City Engineer on a case by case evaluation.

Asphalt pavement shall be designed by the Asphalt Institute Method, or an approved equivalent method provided it is a nationally recognized procedure.

Design of asphalt concrete pavement structures by the Asphalt Institute Method shall conform to the guidelines of The Asphalt Institute Publication, Thickness Design Asphalt Pavements for Highways and Streets Manual Series No. I.

- 1.) AASHTO T-193 (CBR Method), or
- 2.) AASHTO T-190 (R-Value Method), or
- 3.) If the CBR value of the subgrade exceeds twenty (20) or the R value of the subgrade exceeds sixty (60), then CBR and R-value methods shall not be used.

E. Portland Cement Concrete Pavement

The design of Portland cement concrete streets shall be governed by the guidelines and requirements of the Portland Cement Association (PCA) design procedures found in the following publications:

- 1.) Concrete Streets: Typical Pavement Sections and Jointing Details
- 2.) Thickness Design for Concrete Highway and Street Pavements
- 3.) Joint Design for Concrete Highway and Street Pavements

The subgrade shall be tested to determine the Modulus of Subgrade Reaction, k, in order to design the street structure. A correlation of CBR to k may be made using Figure 2, provided in Thickness Designs for Concrete Highway and Street Pavements. In addition, the City requires that the following be incorporated into the design and construction specifications:

- 1.) Use a minimum twenty (20) year design period.
- 2.) Minimum thickness of Portland cement concrete shall be five (5) inches.
- 3.) The minimum concrete specifications shall be 5,000 psi (compressive) and 650 psi (flexural) in 28 days. The minimum cement content will be 660 pounds per yard, with a maximum water / cement ratio of 0.48. Slump shall range from 3-inch to 4-1/2-inch. Entrained air shall be from four (4) to six (6) percent.
- 4.) A design joint plan shall be prepared and incorporated into the street construction plans. Longitudinal and transverse joint locations shall be clearly delineated. Transverse joints shall be skewed forward two (2) feet per lane with right and left curb street stationing noted for each end. Joint spacing (in feet) should not exceed 1.5 to 1.75 times the slab thickness (in inches). For example, an 8-inch thick slab would have a maximum joint spacing of 12 to 14 feet. The maximum length to width ratio shall be 1.25:1.0 for any panel unless there are other constraints that the City Engineer will examine on a case by case basis.

2.34 Utilities

A. Curb Markings

When new curbing is being placed, a stamp shall be placed to mark where each water and sanitary sewer service crosses the curb line. The method of marking the curb shall be approved by the City Engineer and noted on the approved construction plans. If an imprinting stamp is used, the impression left for a water service shall be the letter "W"; for a sanitary sewer service, it shall be the letter "S". These impressions shall be two (2) inches high, placed on the face of the curb.

B. Trench Restoration

Trench restoration shall be either by a patch or overlay method as determined by the ~~Public Works Director or the~~ City Engineer or designee. Unless otherwise approved, trenches cut in the travel lane parallel to the roadway will require a grind and overlay of the entire travel lane from the centerline to the edge of pavement. When a patch method is used, the trench limits shall be saw cut prior to the final patch.

All trench and pavement cuts shall be made by saw cuts. The saw cuts shall be a minimum of one (1) foot outside the trench width. If the permit requires an overlay, the contractor may use a zipper or other approved method for the cutting of the existing pavement.

During trench construction, temporary restoration/cover of the trench shall not have a separation ("lip") between the trench surface and adjacent pavement of more than ¼ inch.

C. Utility Locations

Utilities shall be located horizontally within the right-of-way in accordance with City Standards.

2.35 Traffic Calming

Traffic calming measures shall be used by the developer on all Collector and Residential Access streets to reduce traffic speeds unless otherwise approved by the City Engineer. Traffic calming measures may also be required by the City Engineer and/or Community Development Director to mitigate traffic impacts or as required by Ridgefield Municipal Code. Coordinate with the City Engineer on acceptable traffic calming measures.

2.36 Commercial Cross Circulation

Pedestrian, bicycle and vehicular cross circulation shall be maintained between adjacent commercial developments, especially to reduce or eliminate the use of the City's arterial and collector system for trips between adjacent uses. Access shall be no greater than 750 feet in length away from another access point or public connection unless approved otherwise by the City Engineer. A minimum of one cross connection shall be provided. Cross connection shall be designed to accommodate emergency services.

In the event of a secured site or other instances where providing commercial cross circulation may negatively impact public health and safety, requests to waive or modify this requirement shall be submitted through a design modification for review and action by both the ~~Public Works Director~~ City Engineer, or designee, and Community Development Director.

2.37 Roundabout Design

Roundabouts shall be designed following the guidance from the National Cooperative Highway Research Program (NCHRP) Research Report 1043 published by the Transportation Research Board and the WSDOT Design Manual. Design information provided to City shall include the following:

A. Fastest Path

As part of the engineering submittals, exhibits showing the fastest paths for all movements shall be provided including calculations of the radii and speeds. Offsets for path alignment shall follow guidance from the WSDOT Design Manual.

B. Vehicle Turning

As part of the engineering submittals, exhibits showing the vehicular turning movements for all legs and movements originating from each leg of the roundabout. Vehicles used shall be those of the design vehicles for the roundabout. Additionally, movements shall be shown for other vehicles that are intended to use the roundabout less frequently but will be accommodated (i.e. fire truck).

C. Signage

Signage for the roundabout and approaches shall follow MUTCD standards.

D. Central Island

The central island shall include a 20-24" tall "knee wall" to protect workers and the interior features from vehicles which may attempt to encroach in the roundabout. That knee wall feature is included in Figure xx-x in the standard details.

The central island for the roundabout shall be designed flat and consist of low maintenance ground covers. The design shall provide irrigation sleeves and power conduit sleeves under the roadway to the island for future services.

- E.** The City's Roundabout Committee will make recommendations of central island designs to City Council, who will have final decision on the design. If applicant desires a specific concept, the proposal shall be presented to the committee and approved prior to inclusion in submittal documentation. The inner central landscaped island shall include City's standard "Knee Wall" detail directly behind the truck aprons inner curbing.

F. Pedestrian Crosswalks

All new roundabouts shall include pedestrian crosswalks. All new multilane roundabouts shall include an actuated pedestrian crossing flashing beacon system. Under guidelines adopted by the United States Access Board that took effect September 7, 2023, the Public Right-Of-Way Accessibility Guidelines (PROWAG) require that all roundabouts with flashing beacon indications shall have accessible pedestrian systems (APS)^{2 3}. These APS systems shall include a locator tone that repeats every second, audible 6-12 ft from the button or to the building line, with intensity responsive to ambient sound.

2.38 Street Cut Restrictions (Reserved Pending Adoption of Municipal Code Revision)

The City of Ridgefield is putting additional care and significant investment into its expanding roadway network for its residents. This includes pavement management projects under a voter-approved Transportation Benefit District. As such, to construct and maintain this infrastructure to a high standard, street cut restrictions will be enforced on the effective date of a pavement cut restriction ordinance.

For five (5) years after a street receives final acceptance for construction, reconstruction, pavement rehabilitation or pavement preservation treatments a street cut prohibition will be in effect. Streets constructed with permeable materials will have a street cut prohibition for the life of the street. Pavement cuts may be allowed if a more reasonable alternative for service delivery does not exist and

² <https://polara.com/guide/prowag-accessibility-requirements>

³ <https://www.access-board.gov/prowag/technical.html#r308-accessible-pedestrian-signal-walk-indications>

alternative engineering and trenchless construction methods (e.g., pushing, boring or bore-pulling) have been explored.

Requests for cutting of a street under a street cut prohibition shall be considered design modifications. The design modification request shall include reasons why a pavement cut(s) is necessary and why alternatives to a street cut are not feasible.

CHAPTER 3
STORM DRAINAGE

CHAPTER 3 - STORM DRAINAGE

3.00 General Approval Requirements

- A.** See Chapter 1 for general construction requirements, including the requirements for extension of all drainage conveyance pipes to limits of property, surety bond, utility review, and other general requirements.
- B.** These requirements shall apply to all storm drainage facilities in existing and proposed public right-of-way, public drainage easements, and tracts of common ownership in the City. Storm drainage systems include, but are not limited to: inlets, pipes, ditches, creeks, rivers, wetlands, and stormwater quality and quantity facilities. Storm facilities located on, and serving private property are required to follow the requirements of this section for the design and sizing of water quality treatment and detention facilities.
- C.** As the City transitions into the requirements of a Phase 2 City, stormwater requirements will be updated based on Washington Department of Ecology needs. Standards and timelines for transitions will posted on the City's website at a later date detailing finalized requirements all developers will be required to meet. Until said information is made available by the Department of Ecology, the following requirements stated in Chapter 3 shall be followed.

3.01 Planning Criteria

- A.** The City of Ridgefield has established the requirements for the design of facilities intended to protect the public health, safety, and welfare from damage due to flooding. Beyond that level of protection, additional measures are specified in this chapter which are intended to minimize any potential flooding damage and allow for efficient operation, repair, and maintenance of the storm drainage system.
- B.** In residential and commercial development, storm sewer main extensions are required to assure orderly and adequate extension of the storm sewer system. These extensions are to be in accordance with requirements of development and service availability as established by the City and the Washington State Department of Ecology.
- C.** For development proposals that may contribute to areas of known flooding as determined by the City Engineer, the initial land use application submittal for development proposals may be required to include an off-site analysis report beyond what may be required by the referenced Washington State Department of Ecology Manuals. The off-site analysis is to contain an assessment of potential off-site drainage impacts associated with the development proposal; and propose appropriate mitigations to those impacts.
- D.** Design and construction of drainage facilities, including but not limited to: open channels, conveyance pipe, and inlets shall be in compliance with the latest addition of the City's Ordinances, these Standards, the Standard Details and the 2019 edition of "Stormwater Management Manual for Western Washington" (hereinafter referred to as the Western Washington Manual) prepared by the Washington State Department of Ecology, as amended herein.
- E.** Storm drainage pipes shall be extended through and to the extremes of the property being developed along the natural drainage ways, to provide connection points for future development of unserved property as determined by the City Engineer. No private storm sewer shall be located within any lot other than the lot which is the site of the building or structure served by such sewer. The exception to this may be common areas in planned unit developments, and/or City right-of-ways, or as otherwise approved by the City Engineer.

- F. Provisions must be made for gravity drainage of roofs and foundation drains for all new buildings and structures. Roof and foundation drains shall be piped directly to on-site stormwater systems, through private easements if necessary, or pipe through the curb and discharged to the gutter unless otherwise approved by the City Engineer.
- G. Provisions must be made for stormwater from private property to remain on private property or be collected and directed to a public or private stormwater system or natural drainage way. Runoff from that portion of driveways behind the back of sidewalk (outside the right-of-way) may be permitted to drain directly to the street, provided that treatment and detention facilities are sized to handle this flow.
- H. Stormwater systems on private property shall be designed and constructed to the most recent edition of the Uniform Plumbing Code.
- I. Private stormwater systems that connect to a public conveyance system routed to a local public stormwater facility may be required to be designed and constructed to public standards as required by the City Engineer.
- J. Check that base map conforms to all requirements listed in the water and sewer utilities standard plan format per Chapter 1.

3.02 Exemptions

- A. The following types of projects are exempt from this section:
 - 1.) Forest practices regulated under Title 222 Washington Administrative Code, except for Class IV General forest practices that are conversions from timber land to other uses.
 - 2.) Commercial agriculture practices involving working the land for production.
 - 3.) Road maintenance practices as follows: pothole and square cut patching, overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage, shoulder grading, reshaping/regrading drainage systems, crack sealing, resurfacing with in-kind material without expanding the road prism, and vegetation maintenance.

3.03 General Design Requirements

- A. The City of Ridgefield has adopted the 2019 Western Washington Manual as amended herein.
- B. The City encourages the use of “Sustainable Street” concepts and also Low Impact Development (LID) concepts and techniques. Low-Impact Development (LID) techniques shall generally be designed in conformance with the 2019 Low Impact Development Technical Guidance Manual for Puget Sound, published by the Puget Sound Action Team/WSU Pierce County Extension.
- C. These standards shall also apply to both public and privately owned and maintained systems to comply with current Department of Ecology requirements for the City of Ridgefield.

3.04 Water Quantity and Quality Standards

- A. The minimum standards for the design and construction of stormwater facilities in the City of Ridgefield shall be the same as the Western Washington Manual except as amended herein.
- B. The provisions of this section apply to all new development or redevelopment that:

- 1.) Results in 5,000 square feet or more of new effective impervious surface within an urban area or has more than 7,000 square feet of land disturbing activities, or converts $\frac{3}{4}$ acres or more from native vegetation to lawn or landscaped areas, or converts 2.5 acres or more native vegetation to pasture;
 - 2.) Results in the addition or replacement of more than 1,000 square feet of effective impervious surface for any of the development or redevelopment activities requiring oil/water separators per Section 3.11;
 - 3.) Redevelopment that results in 10,000 square feet or more of replaced effective impervious surface is subject to the provisions of this section for the portion of the site that is redeveloped.
- C.** Projects may utilize the Santa Barbara Unit Hydrograph (SBUH) method for hydrologic and hydraulic analysis and facility sizing. A Soil Conservation Society (SCS) Type 1A rainfall distribution resolved to a maximum of 10-minute time intervals shall be used. Otherwise, facilities shall be sized with an approved Continuous Stormwater Modeling software (Western Washington Hydraulic Model of MGSflood).
- 1.) Isopluvial maps used for analysis shall be "Isopluvial Maps for Design Storms in Clark County," as published in National Oceanic and Atmospheric Administration (NOAA) Atlas 2, "Precipitation - Frequency Atlas for the Western United States," Volume IX, Washington. Isopluvial maps are available from the City of Ridgefield Engineering Department.
 - 2.) Curve numbers used for analysis shall be as specified in "USDA SCS TR-55", June 1986 published by the SCS.
 - 3.) All facilities shall provide emergency overflow routes for storm events that exceed the design capacity of the facility.
- Definitions; "effective impervious surface" shall be defined as those impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system. Impervious surfaces on residential development sites are considered ineffective if the runoff is dispersed through at least one hundred feet of native vegetation. For small residential infill development sites of 8 lots or less, and at the discretion of the City Engineer, the existing impervious areas may be deducted from the total proposed (developed) effective impervious area for the threshold calculation of the "new effective impervious area".
- D.** If a site is proposed to be constructed in phases, the first phase shall have a stormwater facility designed to accommodate the ultimate development of the site. The stormwater facility may be constructed in phases provided a plan for phasing is submitted and approved by the City Engineer.
- E.** Infiltration is the preferred BMP if site conditions are appropriate and groundwater quality will not be impaired. All applicable discharges to groundwater shall comply with the requirements of the Washington State Department of Ecology Underground Injection Control Program.
- 1.) Infiltration systems shall be designed and sized in accordance with Chapter 3.3 of Volume III of the Western Washington Manual or A Review of Infiltration Standards and Practices in Clark County, July 31, 2009 as prepared by the Southwest Washington Branch of the American Society of Civil Engineers.
 - 2.) Infiltration facilities shall be designed to infiltrate the 100-year design storm. Facilities that infiltrate less than the 100-year design storm shall meet the quantity standards of this

section.

- F. Soil groups used for analysis shall be as defined in the most current version of “Hydrologic Soil Groups for Soils in Clark County,” published by the SCS. Alternatively, hydrological soil groups from the United States Department of Agriculture (USDA) “Web Soil Survey” can be used, or soil groups can be developed by a Registered Soil Scientist.

3.05 Design of Conveyance Facilities

- A. Storm drain conveyance systems shall be sized to convey the 25-year storm event, and to pass the 100-year storm event through the site with zero property damage. Where a natural drainage way is designated to remain in open-space as shown on the City's Comprehensive Plan, and that drainage way is not part of the regional conveyance facility, stormwater shall be conveyed through that drainage way by closed conduit sized for the 10-year storm event.
- B. Closed conveyance system elements shall be designed to operate in an open flow, not pressure flow regime, for the design storm.
- C. Runoff from the 100-year storm may leave pipes and channels but shall not rise to elevations more than 2 feet below that of the lowest finished floor of buildings.
- D. For roadway flooding conditions during the 100-year storm, one travel lane in either direction shall remain open to emergency vehicles at all times. A travel lane will be considered to be open to emergency vehicles if the maximum depth of flow in the travel lane does not exceed 0.5 feet.
- E. For parking lot flooding conditions during the 100-year storm, the maximum depth of ponding shall not exceed 1-foot. Storage volumes resulting from ponding in street and parking lot areas may be used to meet the storage requirements of Section 3.09 for the maximum design storm.
- F. Pipelines shall be designed as required below:
 - 1.) The minimum pipe size for stormwater main lines shall be 12-inches. The minimum size for pipes connecting inlets to mainline shall be 8-inches.
 - 2.) The minimum slope for stormwater mainlines shall be as follows:

Inside Pipe Diameter (inches)	Minimum Pipe Slope		Design Capacity (CFS)	As-built Velocity (fps)
	Design	As-built		
12	0.00250	0.00200	1.786	2.034
15	0.00200	0.00150	2.897	2.044
18	0.00170	0.00120	4.343	2.065
24	0.00110	0.00080	7.523	2.042
30	0.00088	0.00058	12.200	2.018
36	0.00065	0.00045	17.051	2.007

Note: Mains installed at a flatter slope than the as-built slope shall be re-laid by the contractor at their expense.

G. Minimum slope for pipes connecting mainlines to inlets shall be 0.0050.

- 1.) Manholes shall be used to connect inlet lines to mainlines and at all locations where there is a change in direction and/or slope.
- 2.) All inside drops and pollution control structures must be 60 inch or larger diameter structures and must be constructed with pipes; no partitions will be allowed.
- 3.) All storm sewer pipe installed in the City shall be one of the following materials meeting the requirements of the Standard Specifications:
 - Smooth Walled Corrugated Polyethylene (ADS N-12 or equal)
 - PVC Sewer Pipe (ASTM D-3034)
 - Class 52 ductile iron
 - PVC Pressure Pipe (AWWA C-900 or C-905)
- 4.) All trench backfill material shall be imported crushed surfacing base course per the Standard Specifications Section 9-03.9(3).
- 5.) Pipe anchor blocks shall be shown at 20 feet on center where pipe slope exceeds 20%.
- 6.) Horizontal Locations
 - a. Locate storm sewer mains in public right-of-way, within the paved road width, per City Standards.
 - b. Outside of right-of-way, locate utilities in easements through paved areas wherever practical. Particular attention should be given to avoiding landscaped areas where trees may be planted.
- 7.) Cap end of existing storm sewer lines to be abandoned as follows:
 - a. Asbestos cement lines: use end cap coupling equal to ROMAC EC501.
 - b. Cast or ductile iron lines: use M.J. cap or plug
 - c. Clay or concrete lines: fill end of line with cement concrete minimum of 12 inches from end of line.
 - d. Plastic lines: use cap or plug fitting compatible with plastic pipe to be abandoned.
- 8.) Depth of Bury (Cover) and Special Protection
 - a. Storm sewer pipe shall be installed with a minimum depth of bury from finished grade of 3 feet unless otherwise approved by the City Engineer. In no case will the depth of bury from finished grade be less than 2 feet or greater than 20 feet. Pipe material shall be based on depth of bury from finished grade as outlined below:
 - i. 2.0 feet to 3.0 feet: Ductile iron pipe or AWWA C900.
 - ii. 3.0 feet to 20 feet: Any pipe listed in 3.05G.3 above.
 - b. Storm sewer pipe shall be encased in steel casing when crossing under rockeries or retaining walls. The casing shall extend beyond footings or rockery face a minimum of 5 feet or the height of the wall or rockery, whichever is greater.
 - c. Changes in pipe material may only occur at structures.
 - d. Buried metal pipe shall be encased in 8-mil polyethylene per AWWA C-105, where required by the City Engineer.

H. Manholes

- 1.) Maximum length of main line between manholes shall be 400 feet.
- 2.) Where inlets connect to manhole, crown of inlet shall be equal to or above main line crown, but not to exceed 18 inches above the invert of the main sewer.
- 3.) Manhole Sizing – Manholes shall be sized such that the structural legs between core holes in the wall of the manhole is no less than 8 inches.
 - a. The minimum angle between the incoming and the outgoing pipe shall be 90°, unless otherwise approved by the City Engineer. Pipe shall be radial with the center of manhole.
 - b. The above configurations shall provide adequate shelves and room for maintenance and performing T.V. inspections.
- 4.) Access shall be provided to every manhole and shall be appropriately sized for maintenance vehicles as determined by the City Engineer. In necessary locations as determined by the city engineer, vehicle access may be provided to every other manhole.

I. A backwater analysis shall be performed under any of the following conditions:

- 1.) Pipes with slopes less than 0.5 percent;
- 2.) Pipes with subcritical flow velocities over 6.5 feet per second;
- 3.) Stormwater main lines forming an angle of 45 degrees or more at junctions;
- 4.) Pipes with inverts less than three feet deep.
- 5.) When backwater analysis is required the hydraulic grade line shall be calculated for both the 25 and 100-year storm events. For the 25-year event there shall be a minimum of one foot of freeboard between the water surface and the top of any manhole or catch basin. For the 100-year event the stormwater flows must meet the requirements of section 3.04(A)(2)-(4).

J. Storm laterals. For storm drain systems that use laterals to drain into a centralized pipe system or catch basins, the following Storm Lateral notes shall be placed on the stormwater plans:

- a. STORM LATERALS CONNECTING TO MAINS OR CATCH BASINS SHALL BE INSTALLED AS A PART OF THE STREET CONSTRUCTION
- b. STORM LATERALS SHALL BE INSTALLED WITH LOCATE TONING WIRE.
- c. CLEANOUTS SHALL BE INSTALLED AT THE EDGE OF THE RIGHT-OF-WAY (HOME SIDE FOR RESIDENTIAL DEVELOPMENTS)
- d. THE HOMEOWNERS' ASSOCIATION (HOA) WILL BE RESPONSIBLE FOR MAINTENANCE OF THE LATERALS. PUBLIC STORM MAINS WILL BE MAINTAINED AND INSPECTED BY THE CITY.
- e. BACKYARD LATERALS WILL BE PRIVATELY OWNED AND MAINTAINED. ACCESS SHALL BE PROVIDED FOR CITY INSPECTIONS.

K. Backwater analysis shall be performed as described in Section 6-6 of the WSDOT Hydraulics Manual, current edition, as prepared by WSDOT.

L. Building setback requirements:

- 1.) 5 feet minimum from covered parking.
- 2.) 10 feet minimum from buildings and retaining walls, or equal to depth of pipe, whichever is greater.
- 3.) 20 feet minimum easement shall be provided between buildings.
- 4.) When passing between any two buildings (residential or commercial, etc.) which are 25 feet apart or less: the sewer line shall be oversized two (2) nominal pipe sizes above the capacity requirements between nearest manholes beyond limits of buildings.

3.06 Clearances / Other Utilities

- A. Water services and inlet lines shall have at least 5 feet horizontal separation.
- B. Check for crossing or parallel utilities. Maintain minimum vertical and horizontal clearances. Avoid crossing at highly acute angles (smallest angle measure between utilities should be between 45 and 90 degrees).
- C. Horizontal clearances between the storm sewer and all other utilities shall be a minimum, of 5 feet.
- D. Vertical clearances between the storm sewer and all other utilities shall be a minimum of 1 foot.
- E. The developer/contractor shall send a letter and preliminary plan to existing utilities to inform them of new construction and shall request as-built information for incorporation into plans. At a minimum the following utilities shall be contacted:
 - 1.) Cable television
 - 2.) Natural gas
 - 3.) Power
 - 4.) Telephone

3.07 Connections to Existing Systems

- A. New storm sewer mains shall connect to existing storm sewer mains at existing manholes, or with new manhole on existing sewer per standard detail.
- B. Where new main is larger in diameter than existing downstream main, check that capacity of existing main is not exceeded by flow from new main.
- C. When connecting to existing manhole, check that requirements of Section 3.05D above are satisfied.
- D. If connecting to existing manhole which has access less than 24 inches in diameter and/or concentric cone (manholes over 5 feet deep), manhole shall be upgraded to include new 24-inch frame and cover and/or eccentric cone.
- E. Connections to end of existing pipe:
 - 1.) If end of pipe is known to have a bell and the new pipe is same material as existing, plans can specify connection by inserting spigot of new pipe into the existing bell end.
 - 2.) If existing line is plain end, or must be cut, plans shall specify use of a coupling to connect new and existing lines.
- F. Approved couplings for use on storm sewer mains include:

- 1.) Ductile iron mechanical couplings (equal to ROMAC) on ductile iron, concrete, or pipes with differing materials or diameters.
- 2.) On PVC or PE mains, PVC or PE couplings with compatible dimension ratio and gaskets to connect new and existing pipes shall be used.

3.08 Design of Stormwater Inlets

Stormwater inlets shall be designed and installed so that stormwater does not accumulate on or flow across roadways. The following general guidelines shall be used in designing stormwater inlets:

- A. Inlet spacing shall be based upon the amount of water that each inlet can capture. Inlet calculations shall be included in the Stormwater Technical Information Report.
- B. In lieu of providing inlet calculations, the following maximum inlet spacing may be used:

Roadway Slope (%)	Maximum Spacing (lf)
0.5 to 1	200
1 to 6	350
6 to 8	250
8 to 12	150
12 to 15	100

These spacings shall be allowed assuming roadway cross-sections from City standards are retained. If roadway sections vary from the approved standard cross-sections, an inlet spacing analysis shall be required to be completed following the requirements within the WSDOT Hydraulics Manual for on grade and sag locations per Section 5-4.

- C. For most cases, inlets should be Type 1 catch basins with herring bone grates. For slopes greater than 4%, vaned grates should be used. At the bottom of sag vertical curbs, combination curb inlets should be used.
- D. Curb inlets may be used in certain situations with approval of the City Engineer.
- E. Inlets should not be located directly in front of ADA ramps. Inlets should be located so as to reduce the amount of water passing in front of ADA ramps.
- F. Catch basins shall be WSDOT Type 1 or Type 2, as necessary. Type 1 catch basins shall have a minimum catch of 18-inches below the invert. Type 2 catch basins shall have a minimum catch of 24-inches below the invert.

3.09 Design of Stormwater Detention Facilities

Stormwater detention facilities shall be designed to provide adequate access for maintenance. Underground detention facilities shall be designed to provide inspection access points at both ends of facility or where deemed necessary to provide proper inspection and maintenance.

The following general guidelines shall be used in designing stormwater detention facilities:

- A. Facilities shall be designed in accordance with the 2019 Western Washington Manual, except as amended herein.
- B. Stormwater facilities shall be fenced as required by the Western Washington manual. Natural looking non-fenced facilities are strongly encouraged wherever possible.
- C. Facilities shall be identified with a sign (see Section 3.13).
- D. Facilities shall be provided with a paved access road with a maximum slope of 15%, unless approved by the City Engineer. Gravel access roads are allowed in private facilities that are to be privately owned and maintained. A turnaround shall be provided for all access roads unless approved by the City Engineer.
- E. When sizing facilities and calculating the rate and volume of runoff leaving a project site, the following criteria shall be met:
 - 1.) The peak release rate for the two-year design storm after development shall not exceed one-half the pre-developed two-year design storm peak runoff rate.
 - 2.) The peak release rate for the 10- and 100-year design storms after development shall not exceed the respective pre-developed design storm peak runoff rates.
 - 3.) After meeting the requirements of subsections (D)(1) and (D)(2) of this section, the pond volume shall be increased by the following multiplication factor F: $F = (\text{composite curve number} / 46) - 0.6$. This correction factor is to be applied to the volume of the pond without changing its depth or the design of its outlet structure, which shall result in an increase in surface area.

3.10 Design of Stormwater Quality Treatment Facilities

- A. Stormwater treatment facilities shall be designed in accordance with the Western Washington Manual. Facilities shall be designed to provide adequate access for maintenance.
- B. Treatment facilities shall be sized to capture, hold and treat the water quality design storm as follows:
 - 1.) Water Quality Design Storm Volume: The volume of runoff predicted from a 24-hour storm with a six-month return frequency (a.k.a., six-month, 24-hour storm. This storm may be assumed to be 2/3 of the 2-year, 24-hour storm).
 - 2.) Water Quality Design Storm Flow Rate: The flow rate predicted from a 24-hour storm with a six-month return frequency (a.k.a., six-month, 24-hour storm).
 - a) Downstream of detention facilities the water quality design flow rate must be the full two-year release rate from the detention facility. Alternative methods may be used if they identify volumes and flow rates that are at least equivalent.

- C. Water quality treatment of runoff from sidewalks, separated bike paths, roofs, fenced fire lanes, trails and infrequently used maintenance access roads is not required if the stormwater drains away from pollution generating surfaces. Runoff from these surfaces that mix with runoff from pollution generating surfaces will require treatment.
- D. For vegetated wet facilities including, but not limited to, wet biofiltration swales, stormwater treatment wetlands, wet ponds and wetpools, plantings are required to be plugs, rootstock or nursery stock. Seeding of wet facilities is not allowed unless it can be demonstrated to the satisfaction of the ~~Director~~ City Engineer or designee that facility vegetation will be fully established before the facility receives stormwater.
- E. Bioretention facilities shall be designed as detailed and defined in the Western Washington Manual. Bioretention facility sizing shall be determined with an approved Continuous Storm Water Modelling system (Western Washington Hydraulic Model [WWHM] or MGSflood).
- F. The level of treatment for projects for basic or enhanced/metals will be determined from the Western Washington Manual. Unless identified below, projects will be required to meet basic level of treatment if triggered:

Enhanced treatment is required for the following project sites that discharge to fish-bearing streams, lakes, or to waters or conveyance systems tributary to fish-bearing streams or lakes:

- Industrial project sites
 - Commercial project sites
 - Multi-family project sites
 - and High AADT roads as follows:
 - Within Urban Growth Management Areas:
 - Fully controlled and partially controlled limited access highways with Annual Average Daily Traffic (AADT) counts of 15,000 or more
 - All other roads with an AADT of 7,500 or greater
 - Outside of Urban Growth Management Areas:
 - Roads with an AADT of 15,000 or greater unless discharging to a 4th Strahler order stream or larger;
 - Roads with an AADT of 30,000 or greater if discharging to a 4th Strahler order stream or larger (as determined using 1:24,000 scale maps to delineate stream order).
- G. Where mechanical treatment is used within the public right-of-way, the following are the approved devices for use by the City:
 - 1.) Basic Treatment – StormFilter using ZPG Medial by Contech Engineered Solutions, LLC
 - a. PhosphoSorb Media will be allowed where required to meet Washington Department of Ecology TMDL requirements.
 - 2.) Enhanced/Metals Treatment – Filterra System by Contech Engineered Solutions, LLC

Where conflicts exist with the above listed systems, the developer's engineer may request a design modification following requirements Section 1.17 addressed to the City Engineer. Submittal of the design modification does not indicate approval of the alternative, and

allowance to deviate from the required structures will be at the discretion of the City Engineer and City's stormwater manager.

3.11 Oil/Water Separators

- A.** The following development activities require American Petroleum Institute (API) or Coalescing Plate Separator (CPS)-type oil/water separators:
 - 1.) Industrial machinery and equipment, trucks and trailer, aircraft, parts and aerospace, railroad equipment
 - 2.) Log storage and sorting yards
 - 3.) Airfields and aircraft maintenance
 - 4.) Fleet vehicle yards
 - 5.) Railroads
 - 6.) Fueling stations
 - 7.) Retail/wholesale vehicle and equipment dealers
 - 8.) Vehicle maintenance and repair
 - 9.) Construction businesses including paving, heavy equipment storage and maintenance, storage of petroleum products (this does not include construction sites)
 - 10.) Other activities that exhibit a significant risk of high oil loading in runoff.
- B.** The following development activities shall require Spill Control (SC) type oil/water separators
 - 1.) Restaurants
 - 2.) Multi-family residential projects creating parking spaces for twenty-five²⁵ or more vehicles
 - 3.) Other activities where the risk of oil spills or illegal dumping of oil or grease is significant as determined by the City Engineer C. For development activities cited in subsections A and B of this section, oil/water separators shall not be required on portions of a site where the risk of oil or grease spills or dumping is minimal.
- C.** Oil/water separators shall be designed in accordance with Chapter 11 of Volume V of the Western Washington Manual.

3.12 Maintenance and Ownership.

- A.** Ownership of Stormwater Facilities – Private ownership of stormwater facilities is required where the facility will treat runoff from private property, as well as where private runoff and runoff from public right-of way will be combined prior to treatment. City ownership of stormwater facilities is required for all facilities that will treat only runoff from the right-of-way. Such facilities are to be located within a public right-of-way.
- B.** Acceptance of Ownership by the City.
 - 1.) Provisional Acceptance. Stormwater facilities, which are to be owned by the City, will be provisionally accepted for ownership upon the approval of the record drawings and approval of an inspection of the facilities by the City. Provisional acceptance of the facilities shall not relieve the applicant from any obligation to undertake any remedial

measures to correct deficiencies in the design, construction, maintenance or operation of the facilities.

- 2.) Final Acceptance of Ownership by the City. No sooner than twenty four (24) months following the provisional acceptance of the facilities, the applicant shall notify the City Engineer that the facilities are eligible for final acceptance of ownership by the City. Prior to their final acceptance for ownership, the facilities shall be inspected to determine that they are in satisfactory condition. The City Engineer may require the applicant to conduct tests of the facilities to reasonably demonstrate that they are operating as designed and to the City standards for quality and quantity control as a condition of final acceptance. Upon approval of the facilities by the City Engineer and all necessary ownerships and easements entitling the City to properly access and maintain the facilities have been conveyed to the City and recorded with the County Auditor, they will be finally accepted for ownership by the City.

C. Maintenance of Stormwater Facilities.

1.) City-Owned Facilities.

- a. Initial Maintenance and Repair. For a period of at least two (2) years following the provisional acceptance of stormwater facilities or thereafter until the facilities are finally accepted by the City, the developer constructing the facilities shall maintain, repair, redesign, reconstruct the facilities to ensure that they operate as designed and to the City standards for quality and quantity control. This obligation shall extend to remedying any damage caused to the facilities by builders or other third parties during the initial maintenance period. The required maintenance shall be performed according to the Stormwater Facilities Maintenance Manual as adopted by Clark County.
- b. During the initial maintenance period, remedial work to correct deficiencies shall be the responsibility of the developer and shall be completed prior to final acceptance. Required remedial work to correct maintenance and construction deficiencies shall be completed by the applicant prior to final acceptance.
- c. Long-Term Maintenance. Following their final acceptance for City ownership, the City shall maintain stormwater facilities.

2.) Privately Owned Facilities.

- a. Responsibility for Maintenance. For stormwater facilities for which the City will not provide long-term maintenance, the developer shall make arrangements with the existing or future (as appropriate) occupants or owners of the subject property for assumption of maintenance to the City's Stormwater Facilities Maintenance Manual as adopted by Clark County Chapter 13.26A. The City Engineer prior to City approval of the final stormwater plan shall approve such arrangements. Final plats shall specify the party(ies) responsible for long-term maintenance of stormwater facilities within the Plat notes for the subdivision or short plat
- b. Initial Maintenance and Repair. For a period of at least two (2) years following the provisional acceptance of stormwater facilities or thereafter until the facilities are finally accepted by the City, the developer constructing the facilities shall maintain, repair, redesign, reconstruct the facilities to ensure that they operate as designed and to the City standards for quality and quantity control. This obligation shall extend to remedying any damage caused to the facilities by builders or other third parties during

the initial maintenance period. The required maintenance shall be performed according to the Stormwater Facilities Maintenance Manual as adopted by Clark County.

- c. During the initial maintenance period, remedial work to correct deficiencies shall be the responsibility of the developer and shall be completed prior to final acceptance. Required remedial work to correct maintenance and construction deficiencies shall be completed by the applicant prior to final acceptance.
 - d. Long-Term Maintenance. Following final acceptance, the responsible parties shall maintain stormwater facilities.
 - e. Easements Required. Easements or a covenant acceptable to the City Engineer shall be provided to the City for purposes of inspection of privately maintained facilities. The minimum dimensions of easements for stormwater facilities are as follows:
 - (i) Pond design and easements shall allow access to all areas within the pond and drainage structures by standard maintenance equipment vehicles
 - (ii) Widths of easements for conveyance facilities shall be a minimum of 15 foot in width, unless otherwise approved or required by the City Engineer.
 - (iii) Commercial sites shall provide covenant over the property for access and inspection for City staff of storm infrastructure and facilities.
- 3.) Privately-Owned Facilities (Subject to Municipal Code amendments to implement the requirements of the City's Phase II MS4 Municipal Discharge Permit)
- a. Stormwater Improvement Restrictive Covenant. The applicant shall prepare a stormwater improvement restrictive covenant that runs with the land for each site and each lot that contains stormwater facilities. The applicant shall record the covenant(s) with the Clark County auditor.
 - b. Required Elements of Stormwater Improvement Restrictive Covenant. The stormwater improvement restrictive covenant shall be in a form approved by the city, and shall include, at a minimum:
 - (i) Designate Responsible Party. Designate the owner or other legally established entity (responsible party) which shall be permanently responsible for operating and maintaining the stormwater facilities and source control BMPs.
 - (ii) Pass Responsibility to Successors. Pass the responsibility for such operation and maintenance to successors in title.
 - (iii) Establish an Operation and Maintenance Plan. Establish a written stormwater operation and maintenance plan in a form approved by the city as described in Ridgefield Municipal Code or stormwater management plan.
 - (iv) Restrict the removal and alteration of stormwater and drainage facilities without approval from the city.
 - (v) Right of Entry for Stormwater Authority. For those stormwater improvement restrictive covenants prepared for a commercial site or subdivision, grant community development and its representatives the right of entry at reasonable times and in a reasonable manner for the purposes of inspecting all stormwater facilities and source control BMPs. This includes the right to enter a property to perform inspections pursuant to this chapter and when community development

has a reasonable basis to believe that a violation of this chapter is occurring or has occurred and to enter when necessary for abatement of a public nuisance or correction of a violation of this chapter. This includes the right to maintain, repair, and/or restore stormwater facilities that have not been properly operated and maintained and the right to charge the property owner for the cost of such maintenance, repair, and/or restoration. (Ordinance or code citation to come)

3.13 Location of Stormwater Facilities

- A.** Runoff treatment and runoff control facilities shall be located prior to the point of discharge into a stream, lake, or fish-bearing water or prior to discharge to groundwater.
- B.** Unless otherwise approved by the City Engineer, infiltration systems shall be located as follows:
 - 1.) 50 feet from the top of any slope greater than 15%;
 - 2.) 100 feet from municipal water supply wells; and
 - 3.) 100 feet from existing or proposed septic drain fields.
 - 4.) Located and designed to prevent influencing existing or proposed building foundations. Infiltration systems used for stormwater disposal shall be located at least one hundred feet from domestic water supply wells.
- C.** Swales and other stormwater treatment facilities using biofiltration shall be located outside easements and corridors used by phone, electric, water, natural gas, and other utilities unless the utilities are installed prior to construction of the biofiltration system.
- D.** Stormwater facilities, other than closed conveyance systems, shall be located at least one hundred feet from existing and proposed on-site sewage system drainfields.
- E.** Stormwater facilities located in critical area buffers shall comply with the applicable siting restrictions in RDC 18.280.

3.14 Signing and Fencing

- A.** Above ground detention facilities shall be fenced following the requirements of the Western Washington Manual.
- B.** All facilities shall be provided with a free-standing sign as placed for maximum visibility from adjacent streets, sidewalks, and path follows:
 - 1.) Sign shall be on a 48-inch by 24-inch aluminum sheet of 0.1250 gauge
 - a. Top of sign no higher than 42 inches from ground surface.
 - b. Do not block any access road.
 - c. Do not place within 6 feet of structural facilities (e.g. manholes, spillways, pipe inlets).
 - 2.) Sheeting to be non-reflective vinyl
 - 3.) Lettering on signage shall be silk screen enamel where possible, or vinyl letters.
 - 4.) Sign background to be of a beige color, with teal letters.
 - a. Sign to have 1/8-inch-wide white border with located 1/4 inch from edge of sign
 - 5.) Text will be of the following Helvetica Condensed with following heights:

- a. Main Title: 3-inch height
 - i. Main title shall describe the main facility type (i.e. Stormwater Pond, Stormwater Treatment Wetland, etc.)
 - b. Sub-Title: 1-1/2 inch height
 - i. Sub-title shall describe maintainer of facility and contact information.
 - c. Text: 1-inch height
 - i. Text shall include educational information about the facility and its function.
 - ii. If facility is lined, text shall reflect this feature.
 - d. All text shall be located no closer than 1-3/4-inch from border.
- C.** Posts shall be made of pressure treated 4-inch by 4-inch posts and shall extend 1-1/2 inch above sign with beveled tops. Post shall be installed in 8-inch diameter concrete filled holes 30-inch into the ground.

CHAPTER 4

WATER

CHAPTER 4 - WATER

4.00 General Approval Requirements

- A.** In the City's water service area, watermain extensions are required to assure orderly and adequate extension of the water utility system. These extensions are to be in accordance with requirements of development and service availability as established by the City and the Washington State Department of Health.
- B.** Water mains shall be extended to the limits of the property being served for service to adjacent parcels where directed by the City Engineer.
- C.** For multifamily residential developments, mobile home parks, RV parks, commercial facilities, and industrial facilities, public water mains shall be extended through easement to individual structures. For purpose of reducing potential water quality problems, such extensions of public water shall be made to the limits of the roadway, parking access serving said buildings. Water mains shall be routed across pavement whenever possible. Each building shall be served by a separate water meter from the public water main.

4.01 Planning Criteria

- A.** Ensure adjacent properties can be provided water service (extend to extreme of property with adequate capacity and pressure).
- B.** Demand projections:
 - 1.) Unit demand, Average daily demand (ADD):
 - a. Single family residential - 160 gallons per capita per day (GPCD), or 400 gallons per day per Equivalent Residential Unit
 - b. Multi-family residential - 80 GPCD
 - c. Nonresidential - Use WSDOH Water System Design Manual Table 5-2
 - 2.) Peaking factors:
 - a. Maximum day demand (MDD) = $ADD \times 2.4$
 - b. Peak Hour Demand = Use WSDOH Water System Design Manual Equation 5-3.
- C.** System parameters:
 - 1.) Water velocity in mains - velocities shall not exceed 10 feet per second during highest demand and fire flow.
 - 2.) Distribution system pressures (measured at building elevation):
 - Desirable- Minimum 50 psi
Maximum 80 psi
 - Allowable- Minimum 40 psi
Maximum 100 psi
 - * Pressure reducing valves are required on all services when water pressure exceeds 80 psi. Pressure reducing valves shall be installed on individual services rather than main lines unless otherwise directed by the City Engineer.
 - 3.) Reservoir replenishment - facilities (e.g., transmission mains, pump stations) shall be sized

to enable storage facilities to be refilled within 1 day after an emergency or major fire.

- D. Fire flow requirements shall be as determined by the Clark-Cowlitz Fire Rescue.
 - 1.) Determination of available fire flow shall be computed using a computer simulated model acceptable to the City with a base demand equal to the maximum daily demand.
 - 2.) Minimum system pressure during fire flow analysis shall be 20 psi at all hydrants and throughout the water system.

4.02 General Design Standards

- A. Check that base map conforms to all requirements listed in the water and sewer utilities standard plan format per Chapter 1.
- B. Thrust Restraint
 - 1.) All thrust restraint for waterlines shall be accomplished through the use of restrained joints.
 - a. Restrained joints for pipe shall be appropriately designed for the required test pressure. The following is an approved list of restrained joint systems:
 - i. LOC TYTE and MJ-TJ pipe with Megalugs, Pacific States Cast Iron Pipe Company
 - ii. Fast Grip and Lok Ring, American Cast Iron Pipe Company
 - iii. TR Flex and Field Lok, United States Pipe and Foundry Company
 - iv. Snap Lock, Griffin Pipe Products Company
 - v. Megalug, EBAA Iron, Inc.
 - vi. Super Lock, Clow
 - vii. Restrained Joint, McWane
 - 2.) Collar thrust blocks or other special blocking designs may be used if necessary. Show all blocking on plans and profiles.
 - 3.) A restraint table shall be provided in the plan set for the pipe size and fittings used.
- C. Check with City Engineer to determine how surrounding development will affect design:
 - 1.) Serve to extreme of property if adjacent property has potential for future development.
 - 2.) All systems shall be looped systems where possible.
 - 3.) Where dead end lines cannot practically be avoided as determined by the City Engineer, a permanent blow off capable of providing a 2.5 fps flushing velocity shall be provided along with provisions as needed for disposal of flushing water.
- D. To assure compatibility with existing system, check with City Engineer to determine hydraulic gradients.
- E. Cap end of existing water lines to be abandoned as follows:
 - 1.) Asbestos cement lines: use end cap coupling and thrust blocking.
 - 2.) Cast or ductile iron lines: Use M.J. cap or plug and thrust blocking.
- F. Minimum watermain size
 - 1.) 8-inch minimum diameter when serving fire hydrants.

- 2.) 6-inch minimum diameter may be used in localized conditions where fire hydrants are served by looped lines, subject to City Engineer approval.
- G. One water sampling station shall be provided for every one-hundred (100) lots developed. All subdivisions with more than fifty (50) lots shall install a sampling station. The sampling station shall be installed per the City of Ridgefield Standard Details.
- H. No lengths of ductile iron pipe less than 3 feet in length will be allowed to be installed with the exception of valve and tee/cross connections.
- I. Local high points and local low points shall be avoided whenever possible. Air release valves shall be installed where necessary at high points in watermain to allow for release of air. Blow-off assemblies will not be required unless requested otherwise by City. Where feasible, locate hydrant assemblies at low points to allow for removal of sediments.
- J. Toning wire shall be included on all pipe installations. Toning wire connectors shall be Pro-Trace TW Connector, part number 96PTTWCBBLUE.

4.03 Valving

- A. 500 feet maximum distance between valves on distribution mains. Long transmission mains with limited services may provide isolation valves at 1,000 foot spacing with the approval of the City Engineer.
- B. Provide valve at both ends of an easement.
- C. Valves shall be placed at all legs of watermain intersections, unless otherwise indicated by the City.
- D. Additional valving may be required for area isolation.
- E. Valves 12 inches and smaller shall be gate valves.
- F. Valves 14 inches and greater shall be butterfly valves.
- G. An in-line valve with appropriate restraint shall be placed at all temporary dead-ends that are likely to be extended in the future to facilitate future connection.

4.04 Fire Hydrants

- A. Fire hydrants shall be public if they are serviced off of a public water main, whether or public or on private property. Public fire hydrants and the connecting water main shall be placed in a public easement.
- B. Fire hydrants may be private when they are located past (after) a private water meter and are served by a private water main.
- C. The number and locations of fire hydrants, fire flow requirements and fire sprinkler components will be determined by the City, or Clark Cowlitz Fire Rescue. Following are general requirements for fire hydrant locations:
 - 1.) **Commercial Buildings:** Fire hydrants shall be located so that no part of a commercial building is more than 250 feet from a fire hydrant measured along a route accessible to fire department vehicles. When a fire department connection (FDC) is installed in conjunction with an automatic sprinkler system, it is required to have a fire hydrant

located within 40 feet of the FDC. The FDC shall be located remote from the building and outside of the building collapse zone. This area should be clearly marked "Fire Zone No Parking". No building access road can be blocked by fire hose while making the fire department connection.

- 2.) **Non-Commercial Buildings:** Unless otherwise approved by Clark-Cowlitz Fire Rescue, a fire hydrant shall be placed at each street intersection, or at spacing not exceeding 600 feet. Intermediate hydrants are required when the distances to any part of noncommercial buildings exceeds 500 feet measured along a route accessible to fire department vehicles.
 - 3.) **Industrial and Commercial Buildings:** Fire hydrants located in street right-of-way shall not be placed within 25 feet of the top of a driveway flare.
- D. Fire hydrants shall not be connected to mains less than 8 inches, or 6 inches in diameter where the length of the 6-inch main is less than 50 feet.
 - E. Fireline/hydrant run over 50 feet in length must be 8 inches in diameter (terminate with tee, plug and hydrant assembly).
 - F. Hydrant shall be located minimum 50 feet from any building, unless approved by the Fire Marshall.
 - G. As per the IFC, fire hydrants shall be located to allow a 36-inch clear space surrounding the hydrant. For example, street lights, sign posts, protective posts, or retaining walls shall be no closer than 36 inches from the nearest portion of a hydrant. There shall also be no obstructions directly in line with any of the ports of the hydrant.
 - H. Piping between fire sprinkler vaults and protected building shall not be shown on water design.
 - I. Guard posts are to be used only in parking lots when no curbs are present or in exposed areas in parking lots.
 - J. Fire hydrants more than 15 feet from an approved access road or fire lane that serves a proposed building shall not be counted in any calculation of fire hydrant spacing. On-site fire hydrants and water supplies on adjacent properties shall not be considered available, unless accessible by fire apparatus on an approved access road. Fire hydrants located on the opposite side of a roadway shall not be considered in the fire hydrant placement calculations unless specifically approved by the Fire Marshal or CCFR.

4.05 Pipe Class / Protection / Cover

- A. All waterlines shall be ductile iron pipe Class 52 unless otherwise noted herein. When crossing under rockeries and retaining walls, pipe shall be installed in a steel casing that extends beyond the footings or rockery face a minimum of 5 feet and extends beyond the back of rockery or wall equal to the height of the wall or rockery or a minimum of 5 feet.
- B. Watermain depth of cover shall be 3 feet minimum and 6 feet maximum from final grade.
- C. Building setback requirements:
 - 5 feet minimum from covered parking to watermain.
 - 10 feet minimum from building (and retaining walls) to watermain.

- 20 feet minimum easement shall be provided between buildings.

When passing between single family residential buildings which are 25 feet apart or less, Class 53 ductile iron pipe shall be used to a point 5 feet beyond the limits of building.

When passing between commercial or multifamily buildings which are 25 feet apart or less, the waterline shall be encased in steel pipe. The casing shall be wrapped with polyethylene as per City standards. The line shall be encased to a point 5 feet beyond the limits of the building.

- D. All ductile iron pipe and adjacent fittings shall be encased in 8-mil polyethylene per AWWA C-105 when crossing gas lines or paralleling within 5 feet where directed by the City Engineer.

4.06 Clearances/Other Utilities

- A. Clearances between water and sanitary sewer mains shall be as follows:

Horizontal and Vertical Separation (Parallel)

A minimum horizontal separation of 10 feet between water lines and any existing or proposed sewer mains, and a minimum vertical separation of 18 inches between the bottom of the water line and the crown of the sanitary sewer mains shall be maintained. The distance shall be measured edge to edge (i.e., from the outer diameter of the pipes.) as shown in Figure C1-2 in the Criteria for Sewage Works Design (rev. 10/2006).

Vertical Separation (Perpendicular)

Water lines crossing Sewer lines at angles including perpendicular shall be laid above the sewer lines to provide a separation of at least 18 inches between the invert of the water line and the crown of the sewer. In the event 18-inches of vertical separation cannot be achieved or the sewer line is required to be installed above the water line, the following is required.

Gravity Sewers Passing Under Water Lines

- Sewer pipe shall be encased in controlled density fill (CDF) with a minimum compressive strength of 300 psi or in a one quarter-inch thick continuous steel, ductile iron, or pressure rated PVC pipe with a dimension ratio (DR) of 18 or less, with all voids pressure-grouted with sand-cement grout or bentonite. Commercially available pipe skirts and end seals are acceptable. When using steel or ductile iron casing, design consideration for corrosion protection should be considered. Encasement shall extend a minimum of 10-feet on each side of the crossing.
- One full length of sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

Gravity Sewers Passing Over Water Lines

Water lines shall be protected by providing:

- A vertical separation of at least 18 inches between the invert of the sewer and the crown of the water line.
- Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water lines.
- The length of sewer pipe shall be centered at the point of crossing so that the joints will

be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

- A water line encased in controlled density fill (CDF) with a minimum compressive strength of 300 psi or in a one quarter-inch thick continuous steel, ductile iron, or pressure rated PVC pipe with a dimension ratio (DR) of 18 or less, with all voids pressure-grouted with sand-cement grout or bentonite. Commercially available pipe skids and end seals are acceptable. When using steel or ductile iron casing, design consideration for corrosion protection should be considered. Encasement shall extend a minimum of 10-feet on each side of the crossing.

Pressure Sewers under Water Lines

- Pressure sewers shall be constructed only under water lines with pressure rated pipe encased in controlled density fill (CDF) with a minimum compressive strength of 300 psi or in a one quarter-inch thick continuous steel, ductile iron, or pressure rated PVC pipe with a dimension ratio (DR) of 18 or less, with all voids pressure-grouted with sand-cement grout or bentonite. Commercially available pipe skids and end seals are acceptable. When using steel or ductile iron casing, design consideration for corrosion protection should be considered. Encasement shall extend a minimum of 10-feet on each side of the crossing.
- B.** Check for crossing or parallel utilities. Maintain minimum vertical and horizontal clearances. Avoid crossing at highly acute angles (smallest angle measure between utilities should be between 45 and 90 degrees).
- C.** At points where thrust blocking is required, minimum clearance between the concrete blocking and other buried utilities or structures shall be 5 feet.
- D.** Horizontal clearances from watermain:
- | | |
|-----------|--------|
| Cable TV | 5 feet |
| Gas | 5 feet |
| Power | 5 feet |
| Storm | 5 feet |
| Telephone | 5 feet |
- E.** Vertical clearances from watermain:
- | | |
|-----------|--------|
| Cable TV | 1 foot |
| Gas | 1 foot |
| Power | 1 foot |
| Storm | 1 foot |
| Telephone | 1 foot |
- F.** The developer/contractor is responsible for sending a letter and preliminary plan to existing utilities to inform them of new construction and requesting as-built information for incorporation into plans. At a minimum the following utilities shall be contacted:
- | |
|------------------|
| Cable television |
| Natural gas |
| Power |
| Telephone |

4.07 Slopes

- A. Vertical bends shall be used when joint deflection would exceed 3 degrees.
- B. All pipe joints shall be restrained where slopes are 20% or greater. Anchor blocks shall be used in conjunction with joint restraint where slopes are 25% or greater.

4.08 Connections to Existing System

- A. When tapping water mains, use stainless steel full booted tees conforming to 18-8 Type 304 stainless steel with a CF 8 cast stainless steel flanged end with ANSI 150 lb drilling. Bolts and hardware shall be Type 304 stainless steel.
- B. Connections to existing mains 8-inch diameter and larger shall be via a wet tap unless otherwise approved by the City.
- C. Connections to existing mains smaller than 8-inches in diameter shall be by cutting in a tee, unless otherwise approved by the City Engineer.
- D. Size on size tapping tees are not allowed unless otherwise approved by the City Engineer.

4.09 Easements

- A. Show all utility easements and identify width. If easement is defined as a constant width on each side of watermain, then show a segment of the easement and label as typical (typ).
- B. All easements shall be a minimum of 15 foot in width, unless otherwise approved or required by the City Engineer.

4.10 Services

- A. Locate water services and indicate size. Sizes shall be determined by the developer and approved by the City Engineer.
- B. For offices, multi-family developments and plats with planter areas, provide irrigation services.
- C. Irrigation shall be by separate water main connection and service unless approved by the Public Works Director or designee. Deduct meters may be allowed for commercial/industrial development.
- D. Static service pressures at ground floor elevation shall be determined at all lots/buildings to ensure compliance with system pressure standards.
- E. Plan shall identify lots/buildings where builder/owner should install individual pressure reducing valves. Individual service PRVs are required on customer side of service lines (after water meter box) when service pressures exceed 80 psi.
- F. Meter boxes shall be located within the right-of-way inside the corresponding property lines for the lot being served unless otherwise noted. Meter boxes shall be placed outside of hard surfaces where practical. Where no other option exists and meter box has to be installed in a paved surface, a Design Modification request per Section 1.17 shall be sent to City for review and approval.

4.11 Backflow Prevention

- A.** Private fire protection systems shall comply with minimum backflow requirements as outlined in the following charts on the following page or as determined by the Clark-Cowlitz Fire Marshall's Office or Clark-Cowlitz Fire District 12.
- B.** Irrigation and special domestic services, because of the varying degrees of hazard shall comply with minimum backflow requirements as outlined below. Some of the concerns with these systems are:
 - 1.) The growth of offensive micro-organisms which can create taste and odor problems.
 - 2.) The leaching of heavy metals such as zinc, cadmium, iron, or lead into the water.
 - 3.) The addition of corrosion inhibitors or antifreeze compounds to protect the piping system.
 - 4.) A loss of pressure on the public water supply main or an increase in pressure on the user's system which would reverse the water flow into the public supply.
- C.** Installation shall comply with the City of Ridgefield requirements and regulations as approved by the State of Washington, Department of Health.
- D.** Following any water meter, a minimum of a double check valve assembly shall be installed. Service pipe and backflow devices installed after the water meter are considered private and the responsibility of the property owner to maintain.
 - 1.) Food carts shall include a reduced pressure backflow assembly after water meter connections and prior to connection to the unit.
- E.** All private fire systems such as double check valve assemblies from the mainline control gate valve shall be owned and maintained by the property owner.
- F.** All backflow [assemblies for domestic water service lines](#) shall be installed in vaults outside of building as close as possible to supplying main. [All backflow assemblies for fire supply lines shall be installed inside of the sprinkled structure.](#)
- G.** Fire systems in existing buildings being revised or upgraded shall comply with current regulations.
- H.** Special "health hazard" facilities (facilities named in cross-connection control W.A.C. 248-54-285) such as hospitals, morgues, wastewater plants, metal plating facilities, laboratories, and food beverage plants, usually contain water connections that could backflow hazardous materials into the potable water supply. Therefore, these types of facilities are required to have backflow prevention devices as noted on the chart on the following page.

Private Firelines and Fire Sprinkler System Chart

	Double Check Valve Assembly	Double Check Valve Assembly with Detector	Reduced Pressure Backflow Assembly	Reduced Pressure Backflow Assembly with Detector
1. Fire system - (without chemical addition) 3-inch & larger		X		
2. Fire system - (without chemical addition) 3/4-inch to 2-1/2-inch	X			
3. Private fire system with hydrants		X		
4. Fire system - (with chemical addition) 3-inch & larger				X
5. Fire system - (with chemical addition) 3/4-inch to 2 1/2-inch				X

Notes:

1. All backflow prevention assemblies require test and inspection at the time of installation and annual test thereafter.
2. Backflow assemblies shall be installed per the standards details.

Irrigation and Domestic Service Backflow Protection Chart

	Double Check Valve Assembly	Reduced Pressure Backflow Assembly	Double Check Valve Assembly and bypass
1. Irrigation system - (without chemical injection)	X		
2. Irrigation systems - (with chemical injection)		X	
3. Tall buildings - over 30 feet above ground level <u>or</u> with in-line booster pump interrupted service permissible	X		
4. Tall building - over 30 feet above ground level <u>or</u> with in-line booster pump uninterrupted service required			X
5. Facilities with health hazards, i.e., hospitals, laboratories, sewage lift stations, car washes etc.**		X	

Notes:

1. All backflow prevention assemblies require test and inspection at the time of installation and annual test thereafter.
2. Backflow assemblies shall be installed per the standards details.
3. If service is uninterruptable, then bypass with RPBD is required.

4.12 Reclaimed Water Systems

- A. Applicability. It is the City's policy to require that all reclaimed water systems meet applicable state standards for the distribution and use of reclaimed water. Where reclaimed water is available for use, the City may require that this water source be given

preference as a substitute for non-potable water or irrigation use. Where reclaimed water systems are authorized or required by the City, they shall be designed per Washington State Department of Ecology standards.